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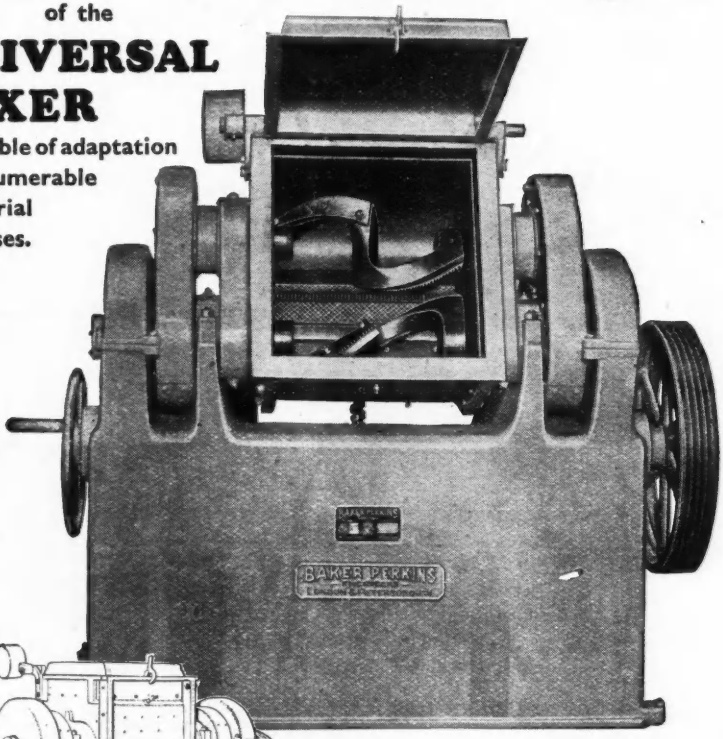

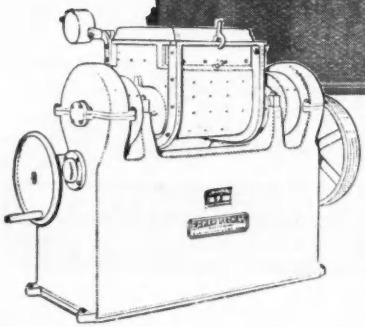

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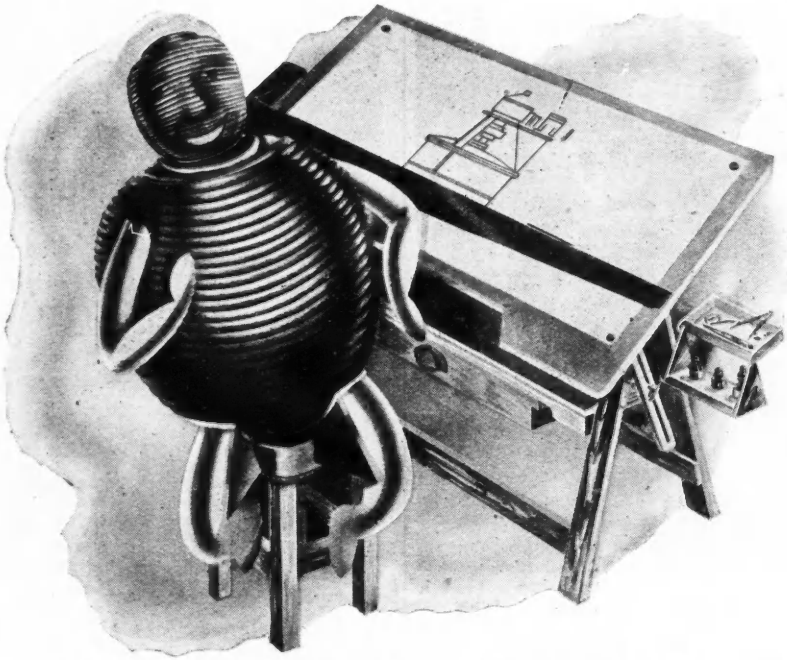

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The Chemical Age

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A Five-Day Week

THE problem of the five-day week in industry is becoming acute in view of the greater insistence on shorter working hours. Throughout the industrial revolution there has been a progressive improvement in working conditions. It was perhaps natural that the earliest factories should be designed for production without consideration of the amenities of life. Most of the employees were totally uneducated, unable even to read or write. It is thus hardly surprising that as Adam exchanged his delving as an agricultural worker to join Eve in her spinning—and in many more arduous industrial pursuits—there should be left no gentlemen to agitate in favour of improved working conditions. There is little doubt that the spread of education was responsible for arousing a feeling of unwillingness to work under slum conditions. Hours of work were progressively decreased; not only Sunday but Saturday afternoon also became a period of rest and relaxation, and as people found more pursuits to occupy their leisure time and became better equipped to occupy it profitably they began to demand not only shorter hours but better conditions at work.

It was pointed out during the difficult years following the First World War that the increasing use of machinery and the inventions of the age had made it possible for the machine to do much of the work that had formerly to be done painfully by manual labour. We looked forward to a time when the machine would so far replace purely manual work that working hours could be reduced drastically indeed and a longer period of retirement could be given to those who were desirous of some leisure at the end of their lives. The late war has altered this conception quite a lot because we have lost the money on which we could have retired and we are compelled as a nation to work for our living harder than for many a generation. For the time being, therefore, our dreams of a very short working week and a short working life must be set aside. The call is for production and still more production, and we doubt whether our generation will secure anything like the amount of leisure that will be possible in a world at peace to those who live 50 or 100 years hence. Fundamentally, the position has not changed. The machine is still with us and its productivity has been increased as a result of the war. All that has happened has been that the golden age of leisure has been set farther ahead in time than it appeared likely to be 20 years ago. This, however, is

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only a setback of a temporary character. We have to remember also that a great part of the world is as yet undeveloped or under-developed. Politically and economically the time has not yet come to rest on our achievements.

We may also note that a century or two hence, when man is really ready to return to the Garden of Eden because he has settled his political problems, secured universal peace, and brought the whole world to a high standard of living, the power to live in his Garden of Eden may have passed from him. That power is dependent on possessing the necessary resources with which to operate his machinery. At present the world has ample supplies of coal. We know that atomic energy as now envisaged, based on uranium, will be exhausted before the world's coal supplies. We have yet to discover a source of energy that will effectively and indefinitely take the place of coal. It may well be, therefore, that the serpent will again be responsible for driving man from his haven of leisure and that this serpent will take the form of shortage of fuel and power.

That is looking a long way ahead, and in the meantime it is necessary for us to come down to earth. We have indicated that for our generation, whatever is done to improve the conditions of work or to reduce working hours, it should always be remembered that the first principle must be to maintain productivity. "In the sweat of thy brow shalt thou eat bread," is the law of life which is inexorable and which has never applied more forcibly than it does to-day. What, then, can be done?

The mining industry might be taken as an example. It is unfortunate that the miners exercise a good deal of political power and that the Government depends so greatly upon them for support. In some respects that fact prevents the mining industry from being considered on its merits. The recent Conference of the National Union of Mine Workers produced an amazing amount of soft soap which was duly spread all over the miners by members of the Government. Disregarding soft soap, however, let us face the fact that the coal output has gone down in a striking manner during the last few years: and this applies not only to the total coal output but to the output per man-shift. The result is that this country is facing next winter the most serious fuel position that it has ever faced—more serious than at any time during the war. The possibility of drastic cuts in electricity and gas supply is already evident. The probability that works will be required to go slow or even to close down for periods on account of fuel shortage already looms ahead. It is a significant fact that the rate of absenteeism at the pits has increased progressively from 6.9 per cent. in 1939 to 10.4 per cent. in 1942, 13.6 per cent. in 1944, 16.3 per cent. in 1945, and over 18 per cent. in the first quarter of 1946. Moreover the output per man-shift while at work has decreased from an average of over 60 cwt. in 1939 to 54 cwt. in 1945. It has been stated that these comparisons mean that if last year the output per unit of capital and labour employed had been as good as in 1941, then with the number of wage-earners now on the colliery books the output would be 210 million tons a year now instead of the present figure of 172 million tons. It is also true that whereas other countries increased their working hours when war broke out, in Britain the miner continued to spend 7½ hours per shift underground and the working week of less than six days remained unchanged.

Mr. Shinwell has now promised the miners the introduction of a five-day week. If it is true that the miners are tired—as are other sections of the nation—after the war, that they are older, and that they need more leisure, we cannot doubt that two consecutive days of leisure each week should enable them to obtain the necessary rest and relaxation so that they will be prepared to work for the remaining five days with an output equal to that of 1939 and with an absenteeism figure similar to that of the same year. It is an interesting experiment and one which many feel has demanded a good deal of courage on the part of the Minister of Fuel. Quite frankly, if we had been in his shoes we should have been very much disposed to do what he has done. But we shall await the outcome of this experiment with considerable interest because it will set a standard for productive enterprise all over the country. We have had the five-day week at THE CHEMICAL AGE offices for many years now and we have found that we can get our work done in five days just as efficiently as in 5½. But that principle may not necessarily apply to factories and works where production is primarily a matter of machinery rather than of personal effort.

NOTES AND COMMENTS

Newton's Tercentenary

DURING the week just past, the Royal Society has been commemorating the tercentenary of the greatest scientist the world has ever known—Sir Isaac Newton. The actual date fell in 1942, when conditions were hardly suitable for an international celebration, but the function has lost nothing by the four years' delay. On Monday, some 140 delegates from various scientific academies met at Burlington House to hear Sir Robert Robinson, P.R.S., announce that the proposal to establish a fitting national memorial in the form of an Isaac Newton Observatory had been recently forwarded to the Treasury, and that the scheme to erect a 100-in. telescope had been accepted in principle by the Chancellor of the Exchequer. Delegates also heard Professor Andrade's lecture on the life and achievements of Newton, in which he recorded that, at the age of 29, the sage had accomplished "a body of scientific work such as no one before or since had done at that age." Speaking of Newton's work in chemistry, Professor Andrade speculated on the hidden meaning behind Newton's words on the transmutation of metals. Two passages in the famous letters on that subject seem to indicate more than a warning against the conversion of base metals into gold, and, in view of recent events, are indeed remarkable. As Professor Andrade said, Newton seems to have derived his knowledge from "something more like a direct contact with the unknown sources that surround us . . . than has been vouchsafed to any other man of science." At the conversazione at Burlington House, on Tuesday, delegates had the opportunity of examining the Royal Society's unique collection of Newton relics.

Co-ordination of Empire Research

THE Empire Scientific Conference held its final session on Monday last week. A large number of recommendations were agreed, covering a wide range of scientific subjects of importance to the Empire. These have been forwarded to the Official Scientific Conference, whose task it is to consider means of implementing them, bearing in mind shortage of manpower, buildings and, in some cases, of money. It is too early to say whether the Empire Conference has been a success; but if only 10 per cent. of the recommendations are put into effect the Conference can be considered a success. It will, however, probably be after ten or fifteen years, when the Conference can be seen in its proper perspective, that its results can be properly assessed. At the very least it can be said that the Conference will exert a beneficial influence on the progress of scientific co-operation in the Empire and on the intensification of scientific effort. Perhaps the most fruitful result will be the experience gained by delegates of what is being done in the other Empire countries. The recommendations include a considerable number of generalities, but there are also a number of specific proposals on which action could, and should, be taken. In addition, it was recommended that a standing central committee be set up to advise on policy for the co-ordination of research into the natural products of the Commonwealth. What this amounts to is co-operation of the Dominions with the Colonial Products Research Council. During the conference the inter-relation between research on diseases in the tropics, nutritional science and land conservation was clearly brought out. The last of these is the basic factor, and unless this problem is effectively solved, any benefits from the prevention of tropical diseases will be nullified by inability to feed the increases in population.

B.A.C. and T.U.C

A DECISION on the question of affiliation to the Trade Union Congress is to be asked for by a general ballot from the members of the British Association of Chemists. The question is dispassionately reviewed in an editorial article in the current issue of the *Journal of the B.A.C.*, following a discussion held at an extraordinary general meeting last month. Mr. David Jackson, the new chairman of the London section, adduced arguments in favour of affiliation, basing his claim on the tendency of Governments to-day, irrespective of party, to look to collective bodies before taking action on any given subject. The opposition took its stand on the essential impartiality of the chemist's position, and gave their opinion that any assistance which chemists might require would be best obtained through the offices of a non-

political organisation. They also brought up the difficulty involving the large (and, we believe, increasing) number of senior chemists holding positions on boards of directors. Editorially, the *Journal of the B.A.C.* holds that the real question of the moment is to get the very numerous unattached chemists affiliated to *some* association, and that the T.U.C. matter takes a secondary place. However, the question is to be put to the vote, and we heartily concur with the suggestion that all entitled should record a vote one way or the other; and with the hope expressed that each individual chemist, if the decision taken does not happen to coincide with his particular views, should not forthwith resign in a huff. Chemists are not particularly vocal people, as a class; it might help the profession if they were a little more ready to express their views through the medium of their Press.

Micro-Manipulation

A DEMONSTRATION of the amazing advances that have been made in the practice of cinemicrography was provided at the theatre of the Films Department of the British Council last Monday, when Monsieur de Fonbrune, of the Department of Cinemicrography, Institut Pasteur, Garches, near Paris, showed some of the films that his department has been producing during the last few years. Experimental work was started by Dr. Comandon and M. de Fonbrune in 1908, and recent results have achieved something near perfection. The majority of the films exhibited were largely of biological interest, and they have, indeed, helped to solve many biological problems; but one series was of more general appeal, namely, that which demonstrated the technique of micro-manipulation, with its possible application to problems of biochemistry, and indeed to microchemistry generally. The extremely fine tools—micropipettes, needles, hooks, etc.—needed for microbiological work are made under direct microscopic observation with an apparatus known as a "micro-forge," in which the requisite heat is applied to the glass under treatment by means of a tiny platinum rod heated to incandescence. In general, the glass used is of the Pyrex type, though soft glass may be used for special purposes. The film showed in detail the methods used in the manufacture of several kinds of instrument; and for handling these instruments a special type of micro-manipulator has been devised, allowing extremely delicate control of their movement. A striking proof of the effectiveness of the method was given by the actual production on the film of life-sized drawings of microbes; the circle within which they were drawn was 10μ in diameter and was afterwards shown comfortably superimposed on a photomicrograph of a fly's leg!

Plastics: a Warning

SOME indication of the extent to which the plastics industry is expanding is to be found in the frequency with which particulars of new plastics companies appear in the columns of this journal. The remarkable developments that have taken place in plastics recently were commented upon the other day by Sir John Anderson when speaking at a luncheon of the London district section of the Institute of the Plastics Industry. He pointed out that a tremendous field lay before them in articles not necessarily used in industry, such as attractive fabrics, but he went on to utter a warning against expecting too much from plastics. Although he agreed the industry was capable of vast development, he considered it would be a mistake to make exaggerated claims for its products, which would not, to any great extent, replace such familiar products as timber, metal, stone, or concrete. Speaking of the scarcity of trained scientists and technicians in this country, Sir John said he was glad to learn that the Institute contemplated providing scholarships on a large scale to encourage young men and women to undertake technical training.

Iron and Steel Output

Increases During Second Quarter

ACCORDING to the Ministry of Supply, the production of pig-iron, and of steel ingots and castings, in the U.K. during the second quarter of this year, both showed increases over the figures for the first quarter. Comparisons are shown in the table below, all the figures given representing tons:

	Weekly average	*Annual rate*
PIG IRON		
First quarter ...	145,500	7,566,000
Second quarter ...	150,500	7,827,000
June	151,500	7,878,000
STEEL INGOTS AND CASTINGS		
First quarter ...	242,600	12,617,000
Second quarter ...	252,100	13,111,000
June	239,900	12,475,000

Phosphating Metallic Surfaces

III—Finishing Treatment

by W. G. CASS

(*Continued from* THE CHEMICAL AGE, *July* 13, 1946, *p.* 38)

FINISHING operations after phosphating comprise immediate rinsing and or sealing, followed by oiling, greasing, painting, varnishing, enamelling, electroplating, or a combination of two or more of these. Thorough rinsing after phosphating is of considerable importance, especially if at the same time a pore-sealing effect is achieved, *e.g.*, by addition of chromic acid or chromate in the rinse-water; for thus also the surface is better prepared for the real finishing treatment by painting, etc.

In some of their early phosphating baths of the copper type the Parker Company proposed subsequent rinsing or treatment in a hot solution of chromate or in a 2 per cent. alkali cyanide solution in order to fix the copper in a more rust-resistant form. *See* also W. H. Allen's U.S.P. 1,260,740. In Parker's B.P. 362,746 phosphate-coated iron or steel containing copper in the coating is treated with a hot chromic acid solution, or with potassium chromate. It is stated that the copper does not directly improve the rust-proofing properties but prepares the surface better for paint. In B.P. 517,049 of the Pyrene Company, in which it is claimed that phosphating can be done in about a minute by spraying, a chromate or oxalic or other rinse is used; as also in Parker's B.P. 551,261, 552,569, 557,846 (stated that chrome rinsing may affect paint adherence). In some cases a non-chromic hot water rinse is recommended. Chromic acid or chromates, of course, figure prominently in various coating processes, with or without phosphating, more particularly for the light metals and alloys.

Thorough Drying Essential

Thorough drying after rinsing is also necessary, and fairly high temperatures may be used, *e.g.*, up to 250° C. or more, for the phosphate coatings are stable at much higher temperatures than this (J. Moshage, *Practical Rust-proofing*, 1934, 73). The Metallges. A.G. proposes, for washing, the addition of small amounts (4-7 g./100 l.) of acid chromate or chromic acid (G.P. 690,447); and also, before varnishing, the sealing of the pores with aluminium oxide (G.P. 597,365), *e.g.*, by treating the phosphated parts with solutions of hydrolytic aluminium salts. The Patents Corporation or Metal Finishing Research Corp. propose after-treatment with dilute chromic, phosphoric, or oxalic acid solution, or with solutions of ferrous, aluminium, or chromium salts, especially nitrates (U.S.P. 2,067,214-6). For rinsing, etc., the Curtin-Howe Corp. (U.S.P. 2,120,212) uses weak alkaline solutions with partial conversion into basic phosphate, comprising, *e.g.*, hydroxide, carbonate, cyanide, sodium aluminate, and basic lead acetate.

For colouring phosphated articles Borodulin and Nemtschinowa (Russ.P. 40,480) propose an aqueous solution containing tannin, iron sulphate, and dextrin, followed by immersion in a chromate solution. A parkerised coating which would not normally be lacquered or otherwise coloured may, however, be easily stained by immersion in a warm dilute solution of dye or stain, dried, and finally sealed. Just recently Parkers have introduced an improved colour-phosphating method which does not apparently require this subsequent staining. The colours are grey, blue, purple, and green. A colour process incorporating a stannous salt together with a dye which is claimed to enhance protective quality of coating is described in a new U.S.P. of J. N. Tuttle, Inc. (B.P. appl. 10,139/45). For other special sealing methods *see* B.P. 554,904, 560,848, 566,306.

Influence of Corrosive Conditions

The true finishing method to be adopted and the appropriate phosphating beforehand depend on the severity of the corrosive conditions to which the surface is to be exposed. If an oil finish is thought to be sufficient from a protective and decorative point of view, or possibly a thin one-coat painting, then a somewhat thicker and perhaps slightly coarser phosphate coating, such as that of ordinary Parkerising, will meet the case. Various methods may be used for oiling, such as centrifuging, spraying, etc., and among the great variety of oils may be included different paraffin fractions. Even with simple oiling a decorative effect may be obtained by embodying a colouring pigment (Parker, Fr.P. 694,869, or Tucker, B.P. 420,461). One or two other methods of achieving a colourful effect have been noted previously.

A thin, compact, and finely crystalline coating is usually regarded as the best for application of a paint varnish, or enamel. For example, in the Bonderising process a layer of very fine crystals is formed, integral with the metal underneath, and providing effective paint adhesion. The applied paint or enamel flows into the interstices

between the crystals and when dried is securely anchored to the metal. Phosphate coatings, being insoluble in water, effectively resist corrosion by water that may penetrate the paint or varnish film, and they thus increase the life of the paint itself. This is further supported by a consideration of the electrochemical theory of corrosion and of paint film failures.

Oil Adsorption Powers

In their work on phosphating as an aid to metal working, Dürer and Schmidt (*loc. cit.*; p. 38) describe the various oil-adsorption powers of different types or thicknesses of phosphate coating. Test plates were degreased and phosphated for 15 sec., followed by wetting or rinsing with machine oil. The phosphated plates, though treated for only 15 sec., held twice as much oil as the unphosphated. A rather surprising result was obtained from tests to determine effect of thickness of coating. Several plates were phosphated for periods varying from 15 sec. to 15 min., the thickness, after 15 min. being four times that of the 15-sec. treatment. Irrespective of thickness, oil adsorption remained nearly the same, and the authors conclude that the oil does not permeate the whole depth of the coating through capillary action, but is held essentially by the roughened surface. This seems to require further confirmation and study. Paint technologists have long realised the importance of adsorption and other surface characteristics on the quality of a paint coating, and this intricate subject cannot be dealt with further here.* It may be of interest, however, to note the so-called phosphating paints, in which a phosphate preparation is applied as a paste or paint. In fact, it is often claimed that the ordinary process of phosphating may be carried out either dipping or spraying, or by brush.

In Burstenbinder's B.P. 410,323 a phosphating preparation is described consisting of binding material, rust-dissolving acid, and an organic acid or salt. For example, phosphoric acid or a volatile acid such as formic is mixed with tannic or other, and the mixture incorporated in cellulose or other varnish. Reaction is said to take place with formation of an organic iron salt. In B.P. 467,839, the Grasselli Chemical Co. uses phosphoric acid plus a sulphonated product of alcohol, or salts (esters) of the latter, *e.g.*, stearyl or cetyl alcohol, sufficiently viscous to apply to vertical steel panels; and in B.P. 470,452, T. B. Unger claims a phosphating paste or liquid (addition to B.P. 468,951) for large structures, used in paste form with dextrine or kieselguhr or glycerine. Other similar patents in this line are B.P. 513,030 (Sterling Varnish Co., U.S.A.) for electrical insulation; B.P. 530,006 (Pyrene Co., Ltd.) containing zinc phosphate, chromic acid, free phosphoric acid, and a wetting agent such as Duponal WA paste; and Schamberger's G.P. 641,725.

While galvanising or other form of metal coating has been proposed as a preliminary to phosphating, the converse is also practised; and nickel plating, *e.g.*, on a phosphated surface was proposed in W. Clark Parker's patent (U.S.P. 1,211,218), and later in U.S.P. 1,887,967 and 1,888,189, or B.P. 346,401 (Parker Rustproof Co.). In B.P. 494,503, of H. Davies, iron and steel are phosphated and then coated with one or more layers of lead, tin, tellurium, or antimony, singly or superposed; and the phosphating may be done chemically or electrolytically.

Renewing the Bath

As the constituents of the solution are not equally or uniformly used it is of course necessary that the regenerating solutions or mixtures shall be carefully controlled accordingly. In restoring alkaline nitrate baths, where only the nitrate ions are used and not the alkali, the Met. Fin. Research Corp. (Parker) uses, instead of alkaline nitrate, nitrates whose basic constituents pass into the coating as phosphates, *e.g.*, of the metals, Mg, Ca, Ba, Sr, Mn, Zn, Cd, Fe, or those of which the basic constituents evaporate at high temperatures, such as boron nitrate (B.P. 427,921, Fr.P. 770,798, G.P. 643,869). In order to maintain the efficiency of zinc phosphate baths the Metallges. A.G. has found that the composition both of the original and of the restoring solutions must be controlled within strictly defined limits (Fr.P. 805,845). The restoring solution contains zinc phosphate and zinc nitrate in which the phosphate/nitrate ratio is from 2.5 : 1 to 1.5 : 1. The original solution must have at least 10g. Zn/l., and the ratio of free to total acid should be 1 : 4 to 1 : 5. *See* also U.S.P. 1,949,090, 2,097,211, and B.P. 473,974.

In phosphating iron in non-ferrous heavy metal phosphate solutions (Zn or Mn) the baths accumulate iron and become unworkable. This increasing concentration of iron phosphate may be prevented (Pyrene, B.P. 477,910) by adding an oxidiser such as potassium permanganate or hydrogen peroxide to oxidise ferrous to ferric phosphate, thrown down as sludge. In B.P. 484,726 of the same firm an oxidising effect is said to be achieved also by suitable arrangement of pumps and filters so that the solution is subjected to atmospheric oxidation by spraying. *See* also Parker, Fr.P. 835,312. In phosphoric or other acid pickling baths (pre-cleaning) regeneration is accomplished by addition of acid, usually sulphuric; and

* A great deal of work has been done with certain types of synthetic resin varnishes for finishes after phosphating, etc. Results from an anti-corrosion point of view are said to be very good.

they hardly belong to the present category phosphating baths. But in B.P. 447,524 of Matières Colorantes-Kuhlmann it is proposed that part of the used or exhausted pickling bath, before regeneration with acid, may be diluted and used as a second bath of acid iron phosphate to form a supporting film for paints or varnish. Another French method, that of R. Jacques-Kahn of Paris (B.P. 526,326), discusses various causes of weakening of bath and proposes among other things addition of caustic soda or carbonate to restore pointage, by neutralising excess acidity, *e.g.*, manganese carbonate together with compounds of hydrosulphurous acid and also aldehydes (acetic or formic) including a product under the trade name of "Rongalite."

Phosphating Non-Ferrous Metals

Among the earlier methods for phosphating non-ferrous metals are those of the Soc. Continentale Parker (Fr.P. 698,699, 710,042, 714,321, and 732,230) for protective coatings on aluminium, magnesium, and zinc, and their alloys. Besides phosphates the solutions also contain chromate, sulpho-molybdate, alkali carbonate, tartaric and citric acids; or for magnesium, nitrate, arsenate, and oxidising agent. For *zinc* and its alloys Parkers propose (U.S.P. 2,082,950) zinc or manganese phosphate solutions containing iron salts to the extent of one-half to one-third of the zinc content, or twice the manganese content. The Patents Corp. (B.P. 487,851) uses a zinc phosphate and iron phosphate solution in which the iron is about 0.15 per cent. and the zinc 0.39 per cent. The American Chemical Paint Co. proposes zinc phosphate solutions containing nitric acid and nickel or cobalt salts (B.P. 493,365); and in the earlier Pyrene Patent (B.P. 394,211) for phosphating a zinc or galvanised surface, ferrous sulphate is used as accelerating agent, together with phosphoric acid and other acids, and nitrate, nitrite, or sulphide.

For both zinc and *magnesium* as well as iron the Pyrene Co., in B.P. 397,879, proposes that the hot acid phosphate solution should contain a metal less basic than the metal to be coated. The methods used for iron and steel by the Met. Fin. Research Corp. (U.S.P. 1,949,090), the Patent Corp. (U.S.P. 2,067,007) and Parker (G.P. 643,869) are also claimed as adaptable to zinc and magnesium. The Dow Chemical Co. (U.S.P. 1,947,122) propose alkaline-, alkaline earth-, magnesium-, or ammonium-phosphate solutions containing also the chromic, tungstic, or metavanadic salts of similar bases. Renault (Fr.P. 805,551) suggests hot manganese phosphate solutions; and similarly Badaljan (Russ.P. 45,482), who in Fr.P. 805,845 recommends solutions containing manganese and iron phosphate, sodium fluoride, or sodium silicofluoride. The coating is said to consist of complex phosphates together with magnesium fluoride.

A considerable amount of research has been done towards finding an efficient method of phosphating *aluminium*, and some success has been achieved; but it remains to be seen whether phosphated aluminium is comparable with the best and latest results of anodic oxidation and/or plating. In the early days Brunskill (B.P. 169,884) claimed a process for phosphating aluminium alloys, by boiling in alkaline solution (caustic soda), steaming, and treating with a zinc-iron-phosphate solution; and in B.P. 396,746 H. C. Hall proposed immersion in hot solution of phosphoric acid in ethylene glycol, glycerol, and the like. In B.P. 441,088, the Pyrene Co., for phosphating aluminium or non-copper alloys thereof, uses a solution or paste of alkali metal carbonate, chromate, and one or more neutral alkali metal salts, such as sodium hydrogen phosphate, sodium chloride or nitrate, up to 1 per cent. or corresponding potassium salts, at 90-100°C. By addition of caustic soda and higher concentration of solution it is claimed that temperature may be reduced. The Granodine process of the Am. Chem. Paint Co. is said to be suitable for phosphating several non-ferrous metals and their alloys.

Special Uses

The use of phosphated blackplate as a substitute for tinplate has attracted some attention in the U.S.A. during the past two or three years, and in Germany for much longer. A comprehensive paper on the subject was published by the research staff of the Metallges. A.G. (*Stahl u. Eisen*, 1942, *62*, 685). Its suitability for food containers has been discussed at length by Luck and Brighton in U.S.A., and by Adams and Dickinson in this country (paper read before Iron and Steel Inst., Autumn Session, 1945); and is also referred to by Hoare and Hedges in their new book on Tinplate (London: Edw. Arnold & Co.). We have already seen that the Parker-Pyrene group has taken out several patents for phosphating steel sheet or strip for fabrication into cans. This has been done on a large scale in the U.S.A. where, among others, the Bethlehem Steel Co. has erected a large plant for this purpose.

In Germany about 1937 two of the leading firms in the sheet-metal industry approached the Metallges., namely, the D. Z. Blechwarenvertriebs G.m.b.H., of Leipzig, and the Blechwarenfabrik Fritz Züchner, of Seesen, and as a result a fairly considerable plant, erected by Maschinenfab. Göhring, etc., for the latter company, started operations in 1938. This bonderised and lacquered blackplate is said to have been in extensive use in Germany just before the

war, and was known under various trade names: Lemnadose, Oftadose, Bonderdose, etc. The plant was afterwards enlarged to an hourly capacity of some 5000-6000 containers. *See* Swiss P. No. 207,211, of the D. Z. Blechwarenvertriebs. The finishing treatment applied *after* the cans had been fabricated—as also was the phosphating—was accomplished with oven-dried synthetic resin lacquers. The Metallges. workers (*loc. cit.*) discuss in some detail the need for careful pre-treatment, in which sand-blasting was preferred; the choice of the right type of Bonderising, giving a thin and finely crystalline phosphate coating; and the superiority of welding the can seams over soldering. It is interesting to note, too, that rather wide differences were found in the efficiency of the different lacquers tested, though these are not definitely specified, and are merely referred to as A, B, and C. B, whatever it was, proved to be by far the best.

Aid to Lubrication

Possibly an even more important application of phosphating as an aid rather to lubrication than anti-corrosion—though the latter is also required—is in the sheet-metal shaping and forming industries, and especially in the deep drawing of metals; also where there is moving contact of metal to metal and risk of scuffing or seizing or welding, *e.g.*, with piston rings, and gears, to which some reference is made below. Jevons in his *Metallurgy of Deep Drawing* (2nd ed., 1941) has rightly drawn attention to the supreme importance of efficient lubrication and indicates in detail the particular requirements of such. As early as 1921, J. H. Gravell (founder of Am. Chem. Paint Co.), in U.S.P. 1,428,087, proposed a thin coating of iron phosphate on steel before rolling, drawing, etc., specifically to inhibit corrosion and without explicit reference to lubrication—though this latter may have been implied. But several years later the Am. Chem. Paint Co. in B.P. 512,594, definitely claimed the lubrication of bearing and rubbing surfaces of ferrous metal parts by means of phosphating and oiling. By that time, however, reference had to be made to the earlier work of Singer (B.P. 455,077, or G.P. 673,405) and to the use of Granoseal phosphating for piston rings to avoid scuffing (*J. Soc. Auto. Eng.*, 1937, *41*, 495). *See* also Metallges., B.P. 494,830, 496,866. In some of these patents phosphating is said to aid by increasing oil adsorption through capillary action; but as pointed out elsewhere by Dürer and Schmidt (*loc. cit.*) such capillary action is denied and adsorption is due entirely to roughened surface.

Ducas, in Fr.P. 812,022, has recommended phosphating and included a tanning solution and graphite suspension; and Tufts, in U.S.P. 2,008,939, suggests the use of alkali and ammonium phosphates as lubricants instead of the oil type: they are more easily washed off than oil. Wetting agents, too, may be used, and, to prevent too rapid drying, glycerin or di-ethylene glycol is recommended. The phosphating of steel articles in the hardening process to avoid burning or overheating, and its use in shaping cast iron parts to prevent seizing, is proposed by Metallges. (G.P. 694,148).

The favourable results obtained by phosphating in the prevention of scuffing of piston rings, etc.—already well known—induced the Automobile Research Committee of the Institution of Automobile Engineers to try similar methods with gears. Several different kinds of chemical surface treatment were tested, including seven types of phosphating—divided roughly into the zinc group and the manganese group—as well as the caustic soda/sulphur treatment (presumably Surfiding), electrolytic tinplating, colloidal graphite anodically deposited, and a nitric acid etching. The general conclusion is that the manganese type of phosphating is best for this particular purpose. *See* report issued by the I.A.E., and three articles in *Engineering*, Aug., 1945.

H. Gonschewski, in B.P. 429,220, has proposed the treatment of smooth castings, in mould or immediately after removal, with a sintering material such as stone powder and/or by phosphating, using a pulverised phosphorus compound, or dipping in hot water bath in which phosphorus salts are dissolved. These salts may be added to a hot water tempering bath.

(*To be concluded*)

Loss of Furfural

Experiments with Wheat Straw

A STUDY has been made by H. D. Weihe and M. Phillips, at the U.S. Bureau of Agricultural and Industrial Chemistry (*J. Agr. Res.*, 1946, *72*, 163) to determine the extent of loss of furfural-yielding constituents at different stages in the isolation of the hemicelluloses of wheat straw. Partial delignification of the wheat straw with a 2 per cent. solution of sodium hydroxide in 50 per cent. ethanol caused a loss of furfural-yielding constituents which amounted to 7.79 per cent. of the total furfural. Wheat straw which had been partially delignified with a 2 per cent. solution of sodium hydroxide in 50 per cent. ethanol and then subjected to the successive action of cold 4 per cent. aqueous sodium hydroxide solution, cold 2 per cent. solution of sodium hydroxide in 50 per cent. ethanol, cold 4 per cent. aqueous sodium hydroxide solution, and finally boiling 4 per cent. aqueous sodium hydroxide solution, suffered little or no loss of furfural-yielding constituents.

Society of Chemical Industry

The Annual Meeting and Luncheon

THE 65th annual meeting of the Society of Chemical Industry was held on July 12 at the Connaught Rooms, Great Queen Street, London, W.C.2, and attracted a large attendance. The morning session was devoted to business and to the presidential address by Dr. Eric K. Rideal, F.R.I.C., F.R.S., who is Professor of Colloid Science in the University of Cambridge and becomes Fullerian Professor of Chemistry in the Royal Institution and Director of the Davy-Faraday Research Laboratory on the retirement of Sir Henry Dale on September 30.

Luncheon was followed by the presentation of the Messel Medal to Dr. Wallace P. Cohoe, M.A., LL.D., who afterwards delivered an address. Dr. Cohoe, president of the Society in 1943-44, was formerly Professor of Chemistry at the McMaster University and is now a consulting chemist and engineer in New York. A member of the American Chemical Society, the American Institute of Chemical Engineers and other scientific bodies, he has specialised in the chemistry of paper and pulp, dyestuffs and synthetic resins. He was chairman of the Canadian Section of the Society in 1912 and of the American Section in 1939-41.

Royal Patronage

At the outset of the annual meeting, Professor Rideal announced that the King had honoured the Society with his patronage for the year. He proceeded to read out a telegram of loyal greetings which had been sent to His Majesty in the name of the members, and the telegram which had been received in reply, conveying the King's grateful appreciation. On behalf of the English members, the president welcomed members from overseas and others who had come from a distance. He expressed the hope that there would be further overseas sections in the not too distant future.

The hon. foreign secretary, Mr. Stanley Robson, read a cablegram from the Canadian Section, conveying best wishes for a successful meeting and congratulations to Dr. Cohoe on being awarded the Society's medal, also another from Mr. Bartram, a vice-president of the Canadian Section, in similar vein. Messages from the American Section expressed appreciation of the award of the medal to Dr. Cohoe and gratification at the recent visit to America of Professor Rideal. There was a further message from Dr. William Cullen, who is now in South Africa and was unable to be present.

The president commented that the meeting was almost a unique occasion, inasmuch as they had with them two past presidents from the American Section, Dr. Cohoe and Dr. Marston T. Bogert. Going on to propose the election of Dr. L. H. Lampitt as president of the Society for the ensuing year Professor Rideal remarked that recently they had seen a resurgence of the position where chemists took a leading part in the conduct of the industry rather than financiers and others. Possibly one of the most important of the modern chemical industries was the food industry and it was clear that the chemical director of the largest food industry in the world was an obvious choice as president of the Society. Apart from that, the Society owed an enormous debt to Dr. Lampitt, especially for his efforts towards the co-ordination of the interests of chemists, not only in this country, but throughout the world.

Elections

The election of Dr. Lampitt to the presidency was carried with acclamation. Professor Rideal, Dr. L. A. Jordan, Mr. C. S. Kimball (secretary of the American Section), and Dr. R. T. Colgate were elected vice-presidents. Mr. Julian Leonard was elected hon. treasurer in place of Dr. Lampitt; Mr. Stanley Robson was re-elected hon. foreign secretary; and Mr. E. B. Anderson and Mr. W. H. Cremer were re-elected hon. secretaries. Dr. H. Baines, Mr. C. Diamond, Mr. F. P. Dunn, and Mr. W. C. Peck were elected ordinary members of the Council in place of the members who retired.

The Annual Report

The annual report of the council for 1945 stated that despite the inevitable and uncomfortable aftermath of six years of war on a scale never before endured, chemists could now look forward to following their vocation in the interests of peace and to the rehabilitation of a shattered world economy. The part which the Society would play in this should be no mean one; already some of the plans for development which had been made during the war years had been put into operation during the year under review. The first step had been the appointment of an editor and manager for the Society's publications.

Dr. R. T. Colgate had resigned his office of joint hon. secretary and was succeeded by Mr. H. W. Cremer. Appreciation was expressed of Dr. Colgate's services, also those of the outgoing president, Professor Rideal, and the other officers.

The increase in membership, recorded the previous year, had been continued, 834 new

members being elected during the year, while deaths and resignations totalled 148, so that once again a new high level of 6667 members had to be recorded, against the 1944 total of 5981. Seventy-eight joint student members were enrolled. The Society's income exceeded that of the previous year by about £800 and that of 1938 by £5000. Subscriptions showed a notable increase, £1400 over the previous year.

The council had decided, together with the other supporting bodies, that the Bureau of Abstracts should conduct its own bookkeeping. This decision did not take effect until the middle of 1945 and no final figures were available to be included in the accounts, but it was reported that the outside sales of the abstracts had increased. It was a coincidence that in its 21st year of service the Bureau should become incorporated. During the year the Bureau received for the first time a grant of money direct from the Chemical Council.

Awards during the year were as follows: The Society's medal, Lord Leverhulme; *American Section*: Perkin Medal, Dr. Francis C. Frary; Chemical Industry Medal, Sidney D. Kirkpatrick; *Liverpool Section*: S.C.I. prizes, R. Blunt (senior), W. F. McDonald (junior), J. D. Speedy (special merit); Hunter Memorial Lecture, Dr. R. E. Slade; Leverhulme Memorial Lecture, G. Parker and J. H. Thomas (divided); *Newcastle Section*: Saville Shaw Medal, K. H. Jack. The John Gray scholarship was not awarded.

The Chemical Council was pursuing its endeavours to find ways and means of providing accommodation for the main chemical bodies. Exploration of the possible facilities generously offered by a City company was proceeding, and the council was alive to the urgency and importance of the matter to the chemical fraternity.

A communication had been received from the Chemical Society stating that its council had adopted proposals which would provide a 50 per cent. increase in seating accommodation in the Chemical Society's library and for additional accommodation for books to allow for normal expansion of the library for at least six years. The Chemical Council made a grant of £338 to the library towards the cost of maintenance.

Colloid Science

Points from the President's Address

IN his presidential address, Professor Rideal decided to deal with an important scientific topic rather than a subject of general character. He chose as his subject Colloid Science, a branch of science on which he is specially well qualified to speak, and one which will play an ever-increasing rôle in chemical industry.

Beginning with a historical review, the President recalled how Sir William Hardy was led to study the electric charges on proteins in solution and the complexes known as the lipoproteins. He came across, in the course of his study, a great variety of new and unexpected properties of matter which now form the corpus of the science of colloids. General principles were soon laid down which ensured, although not clearly understood, the formation of the material in the colloid form. It was then realised that materials could be prepared in various forms and that they were all polyphase macro- or micro-heterogeneous systems, including interfaces, membranes, and jellies.

It was only natural that attempts should be made to examine the possibility of determining the conditions of equilibrium in colloidal systems; and this second phase of the development of the subject has been enriched by many important thermodynamic relations such as the classical equation of Willard Gibbs for equilibrium conditions at interfaces or the relationship between vapour pressure and curvature, of Lord Kelvin.

A great impetus was given to this phase of the subject by the investigations on osmotic pressure of non-aqueous solutions of polymeric materials. Meyer's observations on polymeric molecules were followed by the thermodynamic treatment of Huggins and the experimental work of Gee; and a great debt is due to the Uppsala school under Svedberg for the development of the ultracentrifuge and its application to disperse systems. The position in respect to solutions of colloidal electrolytes and colloid systems in which electrical charges are present is by no means so satisfactory. The pioneer work of Pauli led to the concept of the colloidal particle as a large multivalent ion; and attention was directed to the problem of ion exchange at the surface of the particle. The retention of the so-called "gegen" ions by electrostatic attraction and the development of the zeta potential have been treated in a formal manner and measurements have been made on many of the electrokinetic properties of colloidal systems, but our knowledge is still very incomplete. Recently, attention has been drawn to two major problems in this field, firstly, how the electric forces between charged ions in aqueous solution can be calculated when they are but a small distance apart, and secondly, what is the range of molecular interaction. X-ray examination of colloidal solutions has revealed a number of characteristic long spacings, and it has been suggested that molecular action may have a considerable range. It seems more likely, however, that while ionic interaction may

be extensive, the range of dipolar action sufficiently strong to overcome the normal thermal agitation does not have a greater range than, say, two molecular diameters.

Our knowledge of the kinetics of equilibrium is firmly established in the movement and equilibrium of small particles undergoing Brownian agitation, but the study of the interaction of a solid surface phase with a gas or vapour has led to some confusion. The distinction between Van der Waals and chemi-sorption is now fully recognised, but the general problem of condensation and evaporation is by no means completely solved. Although some information on accommodation and condensation coefficient is available, we do not as yet known the detailed molecular balance in those stages of transition between a solid-vapour and a solid-liquid interface.

The third characteristic stage in Colloid Science lies in the development of the reaction kinetics obtaining in such systems. It is investigations in this field which have so important a bearing on modern chemical technology. Investigations on nucleus formation and nucleus growth play an important part in regulating the growth rate of crystals from supersaturated solutions in the control of the crystalline form and in the sensitivity of the photographic film; while new applications of the reaction kinetics of chain reactions are to be found in the production of polymeric macromolecules.

Left : The new president, Dr. L. H. Lampitt. Right : The outgoing president, Professor E. K. Rideal.

Review of Plastics

The growing importance of synthetic polymers and plastics is reflected in the activity of the group of our Society devoted to these matters. Along with the growth of the plastics industry, we are impelled to pay more attention to the properties and behaviour of matter in the fibrous state. On account of its great economic importance, it is, I think, essential that there should be a survey within the industry of the field of plastics in this country. It is evidently the duty of the plastics industry itself to ensure firstly, that our universities and research centres devote sufficient attention to the subject of polymers, so that well qualified chemists, physicists, and engineers can continue to enter the industry; secondly, that technical colleges and schools may provide courses so that there may enter the industry people skilled in the manipulation of plastic materials; and last, there should be a survey of our potentialities in raw materials so that we may be able to provide all forms of plastic materials in spite of the fact that some of these may be unremunerative from a production point of view.

Great advances have been made in our knowledge of such materials as paints, and fillers such as carbon blacks, due not only to a more proper appreciation of the factors which govern the formation and stability of thixotropic and dilatant systems, but also by the introduction into industry of modern apparatus such as the electron microscope, for examination and control. It is hoped that similar progress may be made with those interesting disperse systems, the coloured plastics and stained glass. Very little of the modern stained glass is comparable in beauty and brilliance to that made by our forefathers and preserved in our churches and cathedrals. Still another dynamic process which is of great interest is that of the flow of gases, vapours, and liquids through and into membranes.

Reactions at the solid-liquid solid-gas, and liquid-liquid liquid-gas interface are also of importance, not only in connection with heterogeneous catalytic processes and electrode reactions, but also in a number of textile and biological problems.

There is still another section of Colloid Science, the importance of which greatly exceeds that of the corresponding section in physical chemistry, namely, the conditions of solvent-solute equilibrium. The extension of our ideas on solvent-solute miscibility to swelling and syneresis is by

no means complete, the changes in entropy taking place on the solution of a crystalline macromolecule in a solvent greatly exceeding that of an ordinary small molecule, and playing a dominant part in the equilibrium of such systems. We have but slight appreciation of the electrical factors that govern the transition from thixotropic to dilatant systems, but several sections of our Society are devoted to the manufacture and use of materials in which these solvent-solute relationships are all important.

The academic investigations into the properties of and the reaction kinetics in monolayers at liquid surfaces are beginning to have their repercussions in the development of industrial emulsions used for a variety of purposes. The discovery that complexes can be formed in the boundary phase which are relatively stable and readily formed by penetration is a factor which affects the efficiency of such systems when used for germicidal or insecticidal purposes.

Interest in foams has again been revived. The technical developments in fire-fighting liquids, in soft sponges of different plastics, and both plastic and metallic foams like sunstitutes for balata wood, reveal a new and wide variety of interesting materials.

In Colloid Science there are numerous interesting problems, interesting to the mind both lay and academic; to chemical industry it is the key for the proper appreciation and development of methods to produce materials in new guises, materials with novel properties and producing new effects.

Annual Luncheon

At the annual luncheon, a welcome revival, which was attended by a large and distinguished gathering, Sir John Anderson, after the loyal toast, proposed "The Society." It is permissible to mention in parenthesis that Sir John's frequent attendance at the meetings of scientific societies gives rise to the hope that the importance of scientific industry is being increasingly recognised by the statesmen of this country. Sir John made reference to his early training in science, but reminded his audience that in the early years of the century there was precious little indication of any belief that science could do much for the industry of this country, which was then still based on empiricism. The salaries of chemists and dustmen were about on a level. He regarded his later preoccupation with scientific industry as part of the result of the unstable and irregular wanderings of his early days, which ended with his appointment to a position in the Civil Service. The outbreak of war in 1914 found him in the responsible position of Secretary of the National Insurance Commission, at a time when we were relying exclusively on Germany for our supplies of synthetic drugs. They succeeded in mobilising the Royal Society, the Universities, and the comparatively few firms who were doing anything in the chemical industry—outside the healthy heavy chemical industry and the excellent output of certain alkaloids—and they managed to supply insured persons, the British Army, and, incidentally, the Russian Army, with everything in the way of fine chemicals they needed. This was, in fact, the beginning of the fine chemical industry in this country. He laid emphasis on this in order to bring out the spectacular and tremendous development of the fine chemical industry since those days. Such was the development that—to take an instance from the late war—the British commanders in Burma actually sought out the *unhealthy* places in which to meet the Japanese, so ill-provided were the enemy, and so immune were our troops, against the customary scourges of the district. Sir John asked for a still better understanding between the industrialist and the scientist. If the Society of Chemical Industry played its part, the prospects were indeed favourable.

A Healthy Symptom

Professor Rideal, in response, expressed the Society's gratitude to Sir John for his benign influence on the chemical industry of the country, instancing his interest in the petroleum by-products, which had made possible the development of an industry based on them. The coupling of technology with pure research was a healthy symptom of the times, and he assured his hearers that the Society would do its best for the progress of the industry during the period of reconstruction as it had in time of war. To make the future of all more certain, he appealed for a greater measure of international understanding and intercommunication among scientists.

The health of the guests was proposed by Sir Robert Pickard, and he made special reference to Sir Alfred Egerton, one of the secretaries of the Royal Society, who, by virtue of his appointment as Professor of Chemical Technology, was a living proof of the fact that Fellows of the Royal Society were not so "pure" as they were sometimes claimed to be. Sir Robert paid a graceful compliment to the presence of the lady guests, with special reference to Mrs. Rideal, Mrs. Lampitt, and Mrs. Cohoe. Sir Edward Salisbury, responding, referred to the importance of realising the fundamental unity of all knowledge, and to the importance of developing links between various scientific subjects. The proceedings concluded with the transference of the regalia of office from Professor Rideal to the new president, Dr. Lampitt.

Medallist's Address

Dr. Wallace P. Cohoe, on whom the award of the Society's Medal was conferred,

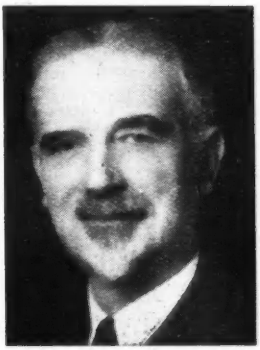
dealt in his address with "Science and Anglo-American Relations." He said the manner in which Mr. Winston Churchill's addresses had been received in America indicated not only a desire for continued Anglo-American friendship, but also for active co-operation in the interests of world peace. In contrast to the impermanence of political and social movements, there was in science the only human agency which was truly permanent, cumulative, and transmissable; but in the realm of human conduct it must regretfully be confessed that there was no body of organised knowledge which had yet attained sufficient stature to be called Science. Despite that deficiency, however, they were sure that humanity was war-exhausted and war-weary; that it longed for peace and security; that it hoped to forge a key that would open the temple of world peace. In the forging of that key it was his belief that science might be a major force.

Gradually, and in the last few years—as human history went—Science had become dominant. In the last few months it had become predominant. That predominance had made obsolete the former means of national offence and defence. It was a predominance that held the world in its hands, which had the power to destroy humanity, and it had been consummated for war purposes by scientists working together toward a common objective in Great Britain, Canada, and the United States. If those three nations could work together for purposes of destruction, it should be possible for them to work in the cause of world peace.

Service to Humanity

The cry had gone up to "stop Science," but no human agency existed with the power either to retard greatly, much less to stop, Science. Science should and must never become a cancerous growth in the body politic. On the contrary, it asked for nothing better than to be allowed to be of service to humanity. After remarking that the conversion of physical superiority into moral leadership called first for some study of certain present-day conditions, Dr. Cohoe referred to the way human ideas were slowly moving to the left; to the inexperience of newly organised nationalities which, as yet, were unaccustomed to the civilities of the comity of nations; and to the fact that in those nations concerning whose future intentions there may have been some doubt, science was enthroned.

The scientific leadership and pre-eminence possessed by the English-speaking nations at the present time centred around the release and control of atomic energy. While chemists and physicists were entitled to look upon their accomplishments in sub-atomic energy release with some complacency, it would be unfortunate to overlook the scientific work which had been done for the preservation of the health of the human race. It was curious that in the study of chemical therapy there should have been a long hiatus between the work of Ehrlich and the discovery that the sulpha drugs were useful in



Dr. Wallace P. Cohoe.

conquering human disease. Those products bestowed upon the physician means of combating disease which he had not hitherto possessed. The discovery of penicillin in England opened up a new world in the treatment of disease. The field of biochemistry and chemical therapy was beginning to receive an attention which it had reserved for a long time.

Pure science needed no urging to go forward. When they contemplated the extent of their ignorance it was not surprising that any well-directed exploration into the unknown was sure to discover something of value. Every lady who treasured her "nylon" stockings was bearing witness as to the value of an excursion into the unknown by pure science. In all that, however, pure science must recognise its dependence on technology.

TECHNICAL APPOINTMENTS

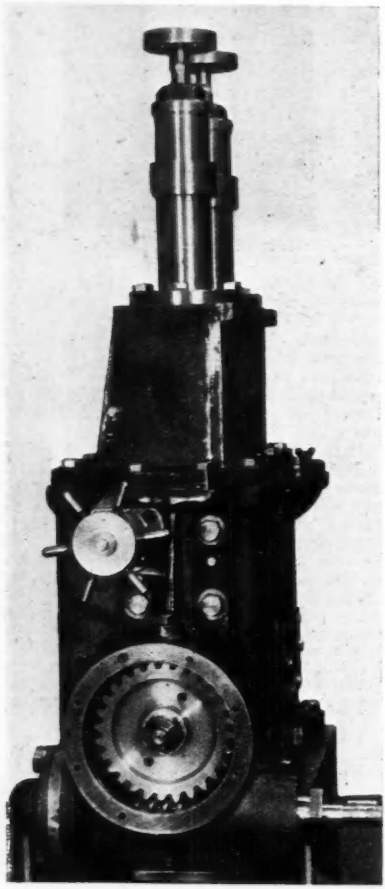
The Technical and Scientific Register of the Ministry of Labour Appointments Department, which operates from York House, Kingsway, London, W.C.2, has the benefit of the guidance of advisory committees, composed of leading representatives of the various professions catered for by the Register, to ensure that it is providing the greatest possible service to employers seeking professionally qualified technical and scientific staff, and to those seeking appointments. Among the chairmen are Sir Robert Pickard (chemistry), and Sir Lawrence Bragg (scientific research).

New Proportioning Pump

A Peter Brotherhood Production

A NEW "Brotherhood" metering and proportioning pump, which claims to be an entirely new development in precision measurement and blending of fluids and gases, has been produced by Peter Brotherhood, Ltd., of Peterborough.

The pump is stated to be particularly suitable for: (1) proportioning anti-knock compounds to petrol; (2) proportioning chemicals for bleaching fabrics, paper pulp and control of colouring matter; (3) treatment of water to effect coagulation, injection of sterilising media, either as gases or liquids, to water and industrial effluents; (4) boiler-water treatment; (5) controlled pumping and metering of catalysts; and (6) blending of pharmaceutical products, and emulsification of oleic and aqueous solutions.



The New "Brotherhood" Pump.

It is designed to deliver liquids or semi-gaseous liquids up to pressures exceeding 250 atmospheres. The understructure is of compact and robust construction in which a camshaft, supported by four bearings and rotated by worm and worm-wheel, operates tappet-type plungers kept in contact with the cams by springs. The effective length of the plungers, which controls the output of the pump, may be varied at will while the pump is running by means of telescopic members screw-threaded one within the other and operated through spiral gears by the manual adjustment of a micrometer handwheel.

The arrangement permits each plunger to be operated independently, if desired, to give a variable discharge from one or more of the cylinders, and provides an accurate means for delivering predetermined quantities. Camshaft, cylinders, and plungers are made of hardened nitrided steel.

Full specifications are provided (in Prov. Pat. No. 13726/46). It is recommended that one liner and plunger as a selected assembly should be provided as spares. A suitable driving motor (electric) can be provided as an extra if required.

LETTER TO THE EDITOR

Shellac Research Bureau

SIR,—My attention has been drawn to a notice in the technical Press which refers to the "winding-up" of the London Shellac Research Bureau. That notice is premature. Both the Indian Lac Cess Committee and the Government of India are at present considering the future of lac research in the United Kingdom, including the location of a research laboratory and the scope of the research work to be undertaken.

Dr. B. S. Gidvani has returned to India on termination of his contract with the Indian Lac Cess Committee. Meanwhile, Mr. A. J. Gibson, who was the Special Officer, Lac Inquiry, from 1929 to 1943, has very kindly consented to deal with inquiries on lac, and letters or telephone calls to India House, Aldwych, W.C.2 (TEMple Bar 8484) will continue to receive attention as in the past. I shall be most grateful to you if you will be so good as to give appropriate publicity to this statement of the present position.—Yours faithfully,

D. B. MEEK
(Sir David B. Meek),
India Trade Commissioner.

London, W.C.2, July 10, 1946.

SAFETY FIRST

Amenity as a Feature of Chemical Works—I

by JOHN CREEVEY

FOR years longer than we care to admit, industry has been getting on with the job, without attaching sufficient importance to working conditions. Until comparatively recently, so long as the work was done, the uncongenial nature of the surroundings had often to be tolerated, and those who were dissatisfied remained in a state of endurance or sought other employment.

There was much of this in the chemical industry until employers with honest consideration for the welfare of their workpeople set out purposely to provide better environment and improved facilities for doing a particular job. The pioneers in this movement quickly realised that workpeople become a greater asset when everything within reason is done to ensure their comfort and cleanliness while working. Almost simultaneously there came some enforcement of better conditions under powers provided by the Factories Acts, and Inspectors of Factories did much to promote the contention that money spent in bringing tidiness to the works or otherwise making employment more acceptable was well spent for an ultimate return of profits.

Apart from this, a demand for better working conditions came from employees in certain industries which needed overhauling, not only from the cleanliness aspect, but from that of greater safety in hazardous occupations. A man no longer wanted to work in an environment that was not only uncongenial, but, as was often the case in chemical and allied works, an environment distinctly unpleasant and dirty. Some types of work were, of course, necessarily dirty, and perhaps likewise hazardous. But even in those conditions better amenities were sought. These included the provision of convenient facilities for washing, and for eating in the meal intervals; also, the provision of special clothing for men to wear while actually at work.

Influence of Conditions

To a large extent amenities and general conditions of safe working are interlinked. When the environment is good there is far less tendency for workpeople to become slovenly, careless, or distinctly negligent. A considerable number of common accidents is primarily due to little more than carelessness. This is greatly reduced under good working conditions, as where efficient ventilation with removal of all obnoxious fumes has a beneficial effect upon the activity of the brain, and suitable illumination, both artificial and natural, prevents eye strain and hesitancy in action. From a scientific point of view it has been proved that the brain becomes sluggish as a result of bad ventilation; the resultant condition of lethargy greatly increases negligence, no matter how willing the subject may be to attain efficiency in his tasks. Even apart from the tendency for accidents to occur by negligence, there is inability to avoid them when conditions tending to lead to an accident become evident.

Reduction of Accidents

Throughout the articles in past issues of THE CHEMICAL AGE, dealing with various ways in which greater safety in chemical works can be attained, great stress has been laid constantly upon conditions existing inside the works. Almost any improvement of conditions that are distinctly bad invariably results in a reduction of the accident rate. This can be proved by an inspection of accident records, provided they are kept conscientiously and are analysed at intervals. Even when apparently at a minimum, the possibility of accidents continually lessens, and improved conditions are then reflected in more efficient service by personnel and consequent greater output at less expenditure of individual energy, which in turn reduces the incidence of illness.

Foremost among amenities comes sanitation. This must be considered from various aspects, apart from the public health viewpoint. An adequate supply of safe drinking water, for instance, should be provided in all places of employment. Such water should be cool, and readily accessible, the immediate surroundings of the tap being kept conspicuously clean. If a safe source is not available, the water must be rendered safe for human consumption, in accordance with advice from a competent health authority or from a firm specialising in water-purification equipment. At those places where drinking water is available, there should be no source of water other than for drinking. At all sources of water regarded as unsafe for drinking, yet needfully provided for other purposes, there should be a notice pointing out that such water must not be used for drinking; further, reasonable precautions should be taken to ensure that any such water is not used in any manner other than that intended. Drinking water should not

be provided at any point on the plant where poisonous materials are in use, nor where there are likely to be obnoxious fumes or the accidental escape of poisonous gases. Special precautions must be exercised in the vicinity of rooms where lead products are handled. Drinking water is, of course, also provided with the usual lavatory accommodation, and here, as elsewhere, its intended use should be clearly indicated.

Drinking-Water Arrangements

In the provision of taps for the supply of drinking water, consideration should be given to a certain matter which, so far as I am aware, has never previously been commented upon. Some people have a habit of putting their lips to a tap when in need of a draught of water. This practice has extended to taps set apart as sources of water for drinking purposes only, and in this way disease can readily be transferred from one person to another. To prevent this, the orifice of the tap should be fitted with a wire cage, preferably made of nickel wire, which adequately prevents direct access of lips to the tap, but otherwise does not hinder the flow of water in a stream for filling a receptacle.

The provision of a common cup for drinking purposes should be prohibited. Where employers provide individual cups to be used but once, there should be an adequate supply of unused cups from a closed container and a receptacle for used cups. Arrangements must be made for washing the cups at intervals to keep pace with average use. Alternatively, it is possible to provide cups or beakers made of stiff water-resisting paper, which can be dispensed from the container singly and thrown into a receptacle as waste immediately after use; the cost of such beakers, if of small size yet convenient capacity, is not prohibitive when taken in the number that may be required per year. Where common cups are provided, it is possible to prevent the transmission of disease from them by keeping them immersed in a recognised non-poisonous antiseptic solution, from which they are removed and rinsed under the tap before use. After use, the cup is rinsed a second time and replaced in the antiseptic solution. The only caution to be exercised is that of not overlooking the replenishment of the solution at recognised intervals, say, each day or every three days. Although this is a reasonable safeguard in cases where the common cup cannot be avoided, it is necessary to rely upon employees to observe the conditions appertaining to the use of the cup.

If it is necessary to use ice for cooling drinking water, the construction of the container should be such that the ice never comes into direct contact with the water. Ice is often manufactured from a source of water which is not necessarily of high purity for drinking purposes; apart from that, it sometimes exhibits a certain affinity for bacteria present in the air, and any bacteria originally present will remain latent while the water is in the frozen state, so that it becomes dangerous immediately the ice begins to melt or from contacting the stream of water in a normal liquid state. As an alternative to ice-cold water at plant where excessive heat is encountered by employees, it is convenient to provide a supply of sodium chloride tablets. These should be kept in a closed container close to the drinking water, and directions as to their use should be marked clearly on the container.

Waste, or refuse, should be collected in suitable containers placed in desirable situations throughout the works. If the waste is liquid, or of such a nature that it is likely to decompose, the receptacle must be leak-proof and non-absorbent. Further, it should be capable of being emptied easily and thoroughly cleansed when necessary. The need for maintenance in a perfectly sanitary condition must be stressed, however apparent that may be, for good sanitary conditions in all situations are a matter of co-operation between users and those whose duty it is to keep things tidy and clean. The removal of sweepings, garbage and waste should be done outside working hours as far as possible, so that it does not become a general menace to health. On the other hand, if the accumulation of waste is likely to become unduly large, facilities must be provided to remove it at regular intervals during working hours, as all parts of places of employment must be kept in a sanitary condition.

The Vermin Question

Consideration must be given to preventing the entrance of vermin, especially rats. If the situation of the works is one where rats can come from a near-by sewer or canal bank, the services of a professional rat catcher should be employed at frequent intervals. If the nature of the material handled at the works, or packing material employed, favours infestation by rats, someone at the works should be detailed to trap or destroy the vermin as a routine duty. The provision of poisoned bait should be avoided; it is far better, in the absence of trapping, to adopt a recognised virus which is harmless both to domestic animals and to human beings.

Where the process utilises such material as waste paper, waste rag, hair, or the like, it must not be overlooked that this material is likely to carry and transmit the causative agencies of infectious disease; in consequence, it is wise to disinfect it before there is any extensive handling.

Plastics Industry and Gas Research

Economical Method of Softening

ALTHOUGH the question may not yet have been conclusively proved there is a good deal of evidence, as established by Megson and Pepper in 1940, pointing to the fact that coal is a natural bakelite in the formation of which polymerisation has taken place, and that bituminous coal is probably a polymer of monomers of moderate molecular weight. Whatever may be the truth of this matter, it remains a fact that the plastics industry owes much to the coal carbonisation industry for its basic materials. The list is formidable indeed and includes phenol with cresol and xylenol, benzene, methane with methanol and formaldehyde, urea, ethylene with phthalic anhydride and phthalic esters, and coumarone indene.

As the two industries remain so closely allied it is perhaps only natural that the plastics industry should be giving ever-increasing attention to the uses of gas for its heating processes, as the production of that gas from coal itself releases abundant valuable by-products, which are the root of plastics and are lost by the burning of raw coal as a source of power. Since it is a young industry, which has been extremely occupied with the many questions involved in its technical development, the plastics industry has not yet been able to devote full attention to its heating processes, a problem which was fully investigated by the Fuel Efficiency Committee of the British Plastics Federation who, under the chairmanship of Dr. A. C. Dunningham, found a large field for potential fuel economies in plastic production.

The gas industry is paying careful attention to this aspect in all branches of plastics manufacture in which gas is helping to ensure the efficient operation of its various processes. This applies equally in drying processes for the highly specialised manufacture of moulding powders, as in the preheating of these powders and in improving the efficiency of presses for their moulding under the influence of temperature and pressure.

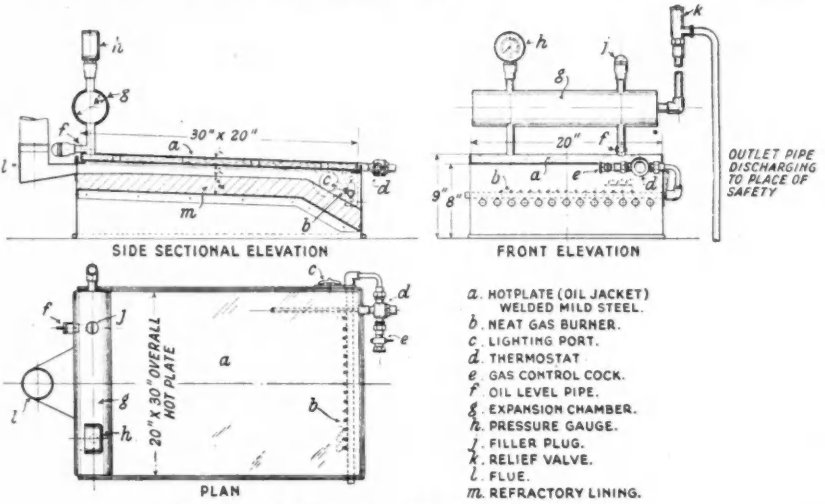


Fig. 1. Hot Plate for softening plastic strips.

Nor does the matter end there; one of the industrial gas centres has evolved a simple method for softening plastic material prior to stamping. This method provides for the heating to be carried out on the surface of a specially designed hot plate since it is considered that this method is preferable, from the point of view of fuel economy, in cases where the heating of the plastic material is only carried out intermittently, continuous throughput not being required. The hot plate, as shown in Fig. 1, was designed for a concern manufacturing spectacle frames, and the plastic material in sheet

form is softened before stamping. The operator receives it in pieces 5¾ in. by 3¾ in. by 5/32 in. thick, from which two frames are produced. The pieces are put on the hot plate until they reach the required degree of softness, when they are put in the pressing machine. The heating surface of the plate, as will be seen from the diagram, consists of a hollow plate containing special high-temperature oil. The hot plate, which is hermetically sealed to prevent oxidation of the oil, is provided with a steel expansion chamber to which is attached a pressure gauge and pressure relief valve. The outlet of this valve discharges to a place of safety beneath the working bench.

The hot plate is heated by 15 neat gas jets mounted on a common float, and temperature is controlled by a rod thermostat immersed in the oil. The maximum gas rate of the burners is 45 cu. ft. per hour, and the required surface temperature of 120° C. is attained within 30 minutes from cold. When the thermostat comes into operation the required working temperature can be maintained at a gas consumption of 19 cu. ft. per hour. It has been found that the heating of the hot plate through the medium of oil has resulted in an evenness of temperature hitherto unknown over the plate's whole surface.

CHINA CLAY WORKING PARTY

The following members have been appointed to the china clay working party in addition to those whose names have already been published (*see* THE CHEMICAL AGE, 1946. *54*, 289): Independent member, Mr. W. W. Varvill; employers' representatives, Mr. J. Keay, Mr. P. Harris and Mr. J. P. Goldsworthy.

Mr. Varvill is a lecturer in mining at the Royal School of Mines, South Kensington, and a consulting engineer. He previously managed gold and silver mines in the Gold Coast Colony and his other appointments included that of lecturer in mining at Birmingham University and surveyor at Mill Close Mines, Ltd., in Derbyshire, 1929-1936, and manager of lead, zinc, fluorspar and barytes mines in Yorkshire, 1919-1929.

Mr. Keay is managing director of English Clays Lovering Pochin & Co., Ltd., and joint managing director of English China Clays, Ltd. He has been associated with the industry since 1919.

Mr. Harris is works manager of Carpalla United China Clay Co., Ltd., and has been connected with the industry since 1913.

Mr. Goldsworthy is managing director of the Goonvean & Rostowrack China Clay Co., Ltd., and has spent a lifetime in the industry.

German Technical Reports

Particulars of Latest Publications

SOME of the latest technical reports from the Intelligence Committee in Germany are detailed below. Copies are obtainable from H.M. Stationery Office at the prices stated.

BIOS 465. *High temperature refractories and ceramics* (4s. 6d.).

BIOS 478. *Textile auxiliary products*: Development of Mersol and Hostapon processes by I.G. Farben, Höchst (5s. 6d.).

BIOS 485. *German filtration industry* (4s. 6d.).

BIOS 504. *Metallgesellschaft A.G., Frankfurt-on-Main*: Metallurgy: Notes on some subjects of research and laboratory activities (1s. 6d.).

BIOS 505. *Aluminiumwerke Göttingen G.m.b.H.*: Light alloy manufacture (1s.).

BIOS 507. *Dr. F. Raschig, G.m.b.H., Chemische Fabrik, Ludwigshafen*: Coal-tar distillation; chlorinated phenols; phenol-formaldehyde resins; synthetic phenols (3s.).

BIOS 511. *Ruhr-Chemie A.G., Sterkrade-Holten*: Interrogation of Dr. O. Roelen: The Fischer-Tropsch synthesis and its products; synthetic lubricants; town gas and methanised gas for automotive propulsion (2s. 6d.).

BIOS 512. *Schlafhorst Chemische Werke G.m.b.H., Hamburg*: Lubricants (1s. 6d.).

BIOS 536. *Tall oil processing and utilisation* (1s.).

BIRMINGHAM UNIVERSITY

The Department of Oil Engineering and the Department of Coal Utilisation at Birmingham University have been combined to form a Department of Chemical Engineering, and Professor F. H. Garner, M.Sc., Ph.D., F.R.I.C., the present head of the Department of Oil Engineering, will be the Director of the Department. Professor Garner is president of the Institute of Petroleum.

Dr. Stacey Ward, who has been appointed to the Second Chair of Chemical Engineering, has been head of the Department of Coal Utilisation, and has been acting head of the Department of Mining since the the death of Professor Moss.

PHENOLPHTHALEIN PRICES

Monsanto Chemicals, Ltd., announce the first rise in phenolphthalein prices—due to greatly increased manufacturing costs—since October, 1944. The revised prices, inclusive of delivery in Great Britain and Northern Ireland, are: 1 cwt., 4s. 10d. per lb.; 28 lb., 5s. per lb.; 14 lb., 5s. 3d. per lb.; 7 lb., 5s. 6d. per lb.

The Chemical Society

Forthcoming Celebration of Centenary

IN July next year the Chemical Society will celebrate the centenary of its foundation. The celebrations would have taken place in 1941 but for the war, for it was "on February 23, 1841, that twenty-five gentlemen interested in the prosecution of chemistry met together at the Society of Arts to consider whether it be expedient to form a Chemical Society." Those twenty-five gentlemen did deem it expedient and so the Chemical Society was born.

The Society was the first formed solely for the study of chemistry and although there were small private chemical societies before 1841 none lasted for any great length of time. At the first general meeting of the Chemical Society, Thomas Graham, the most distinguished chemist of his time, pioneer of colloid chemistry and a discoverer of much important new chemical knowledge, was elected the first president. The organiser of the meeting on February 23, 1841, was Robert Warington, who became the Society's first secretary. Graham and Warington were the leaders of the new organisation and among its present-day possessions one of the most valuable is the 100 year-old Obligation Book, which contains as its first signatures the names of those two pioneers. The book is still signed by new Fellows on their admission.

Offshoots from the Society

The Fellowship of the Society has grown from those 25 gentlemen in 1841 to more than 6000. The study of chemistry as a whole has remained its purpose; because of this the Society has always maintained a special place in the world of chemistry. It has not pursued the purely professional, nor has it specially fostered industrial chemistry, although many great industries have been based on fundamental discoveries made by its Fellows. The professional affairs of chemists are now the province of the Royal Institute of Chemistry (founded in 1877), and industrial chemistry is the concern of the Society of Chemical Industry (founded in 1881). Both these organisations were offshoots of the Chemical Society, as were other societies specialising in sub-divisions of the subject. To-day some of these offshoots, having meantime grown in stature and importance, are again joined with the parent body in the Chemical Council, which consists of representatives of various chemical organisations, and through which chemical industry and individuals subscribe to provide assistance in the publication of the results of chemical research and other information. Success has attended the Chemical Society from the first, and has been due almost entirely to the ready means it provides chemists of publishing their discoveries and affording them a place for discussion and mutual interchange of ideas. The Society has been the model and the elder sister of similar chemical societies set up in other countries, particularly Germany, France, and the U.S.A.

Distinguished Presidents

The science of chemistry has made great advances since 1841; a glance through the list of presidents of the society provides convincing evidence of the important part played by its Fellows, such as (to name but a few), Graham, Hofmann, Williamson, Edward Frankland, Odling, Gilbert, Sir William Perkin and W. H. Perkin, Crookes, Ramsay, Dewar, Armstrong, Meldola, and Pope, every one associated with fundamental chemical discoveries of far-reaching importance.

The discovery of mauve by Perkin is an example of the way in which the work of the research chemist may have a profound influence on social and economic development. From this early discovery has grown the whole of the present-day coal-tar industry, embracing dyestuffs manufacture, synthetic medicinals, the photographic industry, and much more. The pure research on the growth of plants by Gilbert and Lawes at Rothamsted formed the basis of the vast present-day synthetic fertiliser industry, the importance of which in the production of food needs no emphasis in a hungry world. Every day we can see evidence of the work of men like Crookes, Dewar, and Ramsay. The cathode-ray tube of Crookes is the direct ancestor of our television screens; the thermos flask of Dewar is one example of the application of Dewar's low-temperature experiments; and neon display signs are but one instance of the use man has made of Ramsay's epoch-making discovery of the rare gases.

With such a history, and with its present-day virility, the Society is clearly justified in planning to make the celebration of its centenary an important event. The importance was, indeed, internationally recognised in the decision taken in Rome, in 1938, by the International Union of Pure and Applied Chemistry, to hold its next international congress in London, at the time of the centenary of the Chemical Society. This decision is to be implemented next year and immediately following the celebrations on July 15-17 the Eleventh International Congress of Pure and Applied Chemistry will take place in London.

An international outlook has always been

characteristic of the Society and this will be reflected in the series of social and scientific events which will constitute the three days of celebrations. Many distinguished overseas delegates are to be invited. These will include the Honorary Fellows of the Society, among whom are the world's greatest chemists of to-day. If all those invited are able to attend, London will see in July, 1947, perhaps the greatest international gathering of chemists that has ever taken place. One of these distinguished visitors will be invited to follow in the line of Dumas, Cannizzaro, Wurtz, Mendeleef, Ostwald, Fischer, Richards, Arrhenius, Bohr, Debye, Rutherford, and Langmuir as the Society's Faraday Lecturer. The Faraday Lectureship was founded in 1867 to commemorate the name of Michael Faraday, who was elected a Fellow of the Society in 1842, and was one of its vice-presidents. In addition to the Faraday Lecture, it is intended that there should be a centenary address and a formal ceremony for the presentation of addresses, as well as an exhibition at the Science Museum, etc.

Committees for the Occasion

The Chemical Society is already well forward in planning for the occasion and has enrolled some of its leading Fellows as an executive committee, which has put the arrangement of details in the hands of a number of sub-committees; the chairmen of these are indicated in the following list of the members of the executive, of which Prof. C. N. Hinshelwood, president of the Society, is chairman: Dr. M. P. Applebey, Mr. A. L. Bacharach (chairman of the Publicity Sub-Committee), Dr. G. M. Bennett, Dr. F. H. Carr, Prof. J. W. Cook, Dr. C. J. T. Cronshaw, Mr. F. P. Dunn (treasurer of the Society and chairman of Finance Sub-Committee), Sir Alfred Egerton, Prof. A. Findlay (chairman of Meetings, Entertainments and Social Functions Sub-Committee), Prof. C. S. Gibson, Prof. J. M. Gulland, Sir Ian Heilbron (chairman of Reception, Membership and Accommodation Sub-Committee), Lady Heilbron (chairman of Ladies' Sub-Committee), Prof. D. H. Hey (hon. secretary of the Society), Prof. E. L. Hirst, Prof. C. K. Ingold, Dr. L. H. Lampitt, Dr. R. P. Linstead, Prof. T. S. Moore (chairman of Centenary Volume Sub-Committee), Sir Robert Pickard, Mr. H. V. Potter, Mr. J. Davidson Pratt, Prof. E. K. Rideal, Sir Robert Robertson (chairman of Exhibition Sub-Committee), Sir Robert Robinson, Dr. F. Roffey, Prof. N. V. Sidgwick, Dr. J. L. Simonsen (hon. secretary of the Society), Prof. A. R. Todd, Prof. W. Wardlaw (hon. secretary of the Society), with Dr. D. C. Martin (general secretary of the Society), as secretary.

Swiss Chemical Industry

Further Company Reports

THE favourable picture which emerged from an analysis of the annual reports for the year 1945, issued by a number of well-known Swiss chemical companies (*see* THE CHEMICAL AGE, May 11) is, on the whole, confirmed by the results achieved by the remaining producers. F. Hoffmann-La Roche & Co., A.G., Lausanne, a firm of world-wide reputation, reports encouraging results for last year. The transport position has improved more quickly than was expected and regular supplies are again reaching territories closed to the company during the war. However, in spite of the general improvement, the supply position in basic products is by no means back to normal, and a number of important raw materials are in short supply. The policy of allowing the greatest freedom to foreign subsidiaries has yielded sound results, but considerable difficulties are being encountered in the transfer of profits. The company reports a gross profit of 17.10 million Swiss francs (17.49), and a net profit of 3.41 million francs (3.53). An unchanged dividend of 40.50 francs has been declared, to which has to be added a special anniversary distribution of the same amount.

Durand & Huguenin

Excellent financial results have been reported by Durand & Huguenin A.G., Basle, which, in spite of a temporary interruption owing to fuel difficulties, is again supplying a number of countries with its products, especially dyestuffs. In order to achieve greater independence, the production of certain basic materials has been taken up by the firm, necessitating the construction of new plant. Profits have doubled from 423,888 Swiss francs in 1944 to 858,930 last year, and a dividend of 10 per cent. (5 per cent.) has been declared. Both pension and social funds have been increased.

Lonza

The Lonza Elektrizitätswerke und Chemische Fabriken A.G., Basle, while confident about developments in the immediate future, issues a reminder that most industrial nations have increased their chemical production capacity, which might lead to a decline of Swiss exports. Domestic demand, especially for nitrogen fertiliser, has been fully met, but the coal shortage made it impossible to seize all the available export opportunities. Negotiations have been initiated with the Allied authorities about the company's plants in Germany, but no results have as yet been made public. Gross profits amount to 13.25 million Swiss francs (13.32), and out of the net profit of 4.28 million francs (4.54), an unchanged dividend of 6 per cent. has been declared.

Oil and Colour Chemists' Association

Annual General Meeting

THE annual general meeting of the Oil and Colour Chemists' Association was held at the Grand Hotel, Birmingham, on July 12, with the President, Dr. H. W. Keenan, in the chair.

Mr. F. Fancutt, moving the adoption of the annual report of the Council for 1945-46, commented that the account of the Association's activities was impressive, and there was no doubt that in many directions the Association was moving on the right lines. The work started by way of co-operative research was a very fine gesture, and it would grow. The Council as a whole were very conscious of the whole-hearted effort of Mr. S. G. Tinsley in that connection.

The president paid warm tributes to members who had given a great deal of work and time to the Association, mentioning particularly Mr. A. H. Whitaker, hon. secretary, Scottish Section; Mr. G. N. Hill, the association's hon. editor, who felt that he should retire from that ofice; Mr. George Copping, Dr. L. A. Jordan, and Mr. P. J. Gay, who were retiring from the Council; Mr. W. P. Jenkins, chairman of the Newcastle Section; and Mr. H. Clayton, who had served as vice-president.

Amendments to Rules

The meeting agreed to an alteration of rule, providing that junior membership be restricted to persons under the age of 18 years, instead of 21 years, as previously.

One of the proposed amendments to the rules approved by the council, in accordance with a resolution passed at the previous annual general meeting, provided that the council should consist of: the president; not more than five vice-presidents; the chairmen of local sections; six members elected by the whole Association, irrespective of the number of sections; five honorary officers (the immediate past president, the hon. editor, the hon. research and development officer, the hon. secretary and the hon. treasurer). The effect of this is to halve the number of council representatives elected by the sections. After a long discussion, the amendment was adopted, it being felt that the council was unwieldy, and that the amendment enabled the number to be reduced with equity.

Another proposal discussed at some length related to subscriptions. The present subscription is £1 1s. a year for ordinary and associate members, and 10s. 6d. for juniors. The proposal was that ordinary and associate members should pay £1 1s. a year up to the age of 25, and £2 when 25 years and over; juniors to pay 5s. a year. Eventually it was agreed that before the amount of the increase is decided, the council should present a financial statement showing estimated expenditure.

Officers were elected for the ensuing year as follows: *President*, Dr. H. W. Keenan (re-elected); *vice-presidents*: Mr. N. A. Bennett, Mr. J. Crombie, Mr. C. A. F. Hastilow, Mr. C. A. Klein, Mr. W. G. Wade; *hon. secretary*, Mr. A. J. Gibson; *hon. treasurer*, Mr. G. W. Read-Baker; *hon. editor*, Dr. R. F. Bowles; *hon. research and development officer*, Mr. S. G. Tinsley. *Section chairmen who will serve on the Council*: Mr. V. C. Thompson (Bristol), Mr. W. Geary (Hull), Mr. R. J. Ledwith (London), Dr. J. J. Sleightholme (Manchester), Mr. W. P. Jenkins (Newcastle), Mr. F. G. Adams (Overseas—New South Wales), Mr. J. V. Crossley (Scottish).

The following were elected to the Council by the free vote of the Association: Mr. E. J. Bond, Mr. F. Fancutt, Mr. H. Gosling, Mr. D. H. Hewitt, Mr. G. F. Holdcroft, Mr. H. A. Idle.

Liaison Council Proposed

The president referred to his recent visit to America, the purpose of which was to effect an alliance between the technical men of America, Canada, and Great Britain, and, having effected a link-up much earlier with Australia, to arrange for undertaking co-operative research between the four countries. He said it was proposed to form a Liaison Council, consisting of three members of O.C.C.A. and three members of the Federation of Paint and Varnish Production Clubs, U.S.A., and he hoped the New South Wales Section of O.C.C.A. would also have three members. The Liaison Council would be the chief channel through which an effective alliance could be brought about. The whole project had excited immense interest in America. There would be arrangements for a voluntary exchange of literature. It was hoped that members proposing to visit one of the countries mentioned would inform the Liaison Council of their intention so that arrangements could be made for them to receive every possible assistance.

On the council's recommendation, the meeting unanimously agreed that Dr J. J. Mattiello, of U.S.A., be elected an hon. member of the association, in recognition of his outstandiing services to the technical men of both our countries.

Ceylon mineralogists are carrying out surveys of thorium deposits which have recently been discovered in that country.

Personal Notes

At St. Andrews University, DR. H. T. OPENSHAW has been appointed Purdie Lecturer in Chemistry, and MR. F. CHAPMAN, Lecturer in Chemistry, both at United College.

CAPT. F. J. E. CHINA, O.B.E., B.Sc., F.R.I.C., has become chairman of Messrs. Burt, Boulton & Haywood on the resignation of Mr. C. H. Haywood, who is remaining on the board.

MR. PHILIP THOMAS, chemist in the research laboratory at the National Smelting Company's Avonmouth works, Bristol, has won a Leverhulme studentship in Chemical Engineering. The studentship, which is valued at £250, is tenable at University College, London, for a year.

MR. W. MORGAN THOMPSON, who joined Monsanto Chemicals, Ltd., in 1933, as a sales representative, and served throughout the war as an officer in the Army, has been appointed home sales manager under Mr. A. D. Daysh as sales director, and Mr. D. R. Mackie as general sales manager.

ADMIRAL SIR LIONEL PRESTON has resigned from the chairmanship and managing directorship of Titanine, Ltd., and remains a director. MR. A. FLETCHER, who has been a director since 1943, has been appointed chairman. MR. G. W. R. WARD has been appointed managing director, and MR. W. E. ROBINSON an additional director.

DR. W. A. ARCHIBALD, who has been appointed head of the refractories section of the chemistry department of the British Iron and Steel Research Association, has been with General Refractories, Ltd., Glasgow, for the past seven years. He previously carried out research on steel slag refractories problems at the Royal Technical College, Glasgow.

MR. H. F. SCHOFIELD, A.R.I.C., manager of the Manchester office of the Witco Chemical Co., Ltd., since its inception in 1943, has now become a director of the company. After graduating from Manchester College of Technology, he did research work into accelerators and anti-oxidants under Dr. W. J. S. Naunton and spent a short time in America before joining the Witco organisation in 1929.

MR. F. BOWER, of Lever Bros. and Unilever, Ltd., and MR. L. P. O'BRIEN, of the Association of British Chemical Manufacturers, are among members of a Federation of British Industries delegation, which, at the invitation of the Federation of Belgian Industries, is now in Brussels to continue discussions of general industrial and commercial interest, begun when representative Belgian industrialists visited England in January.

Electrodepositors

Technical Society's New Officers

THE results of the recent election of officers and members of council of the Electrodepositors' Technical Society for the 1946-47 session are as indicated below:

President, Dr. S. Wernick, Ph.D., M.Sc.; *Immediate Past-president*, Dr. J. R. I. Hepburn, D.Sc., Ph.D., F.R.I.C.; *Vice-presidents*: Dr. H. J. T. Ellingham, Ph.D., A.R.C.S., A.M.I.Chem.E., F.R.I.C.; Dr. G. E. Gardam, Ph.D., A.R.C.S., F.R.I.C.; Mr. F. L. James; *Honorary Treasurer*, Mr. F. L. James; *Deputy Hon. Treasurer*, Mr. S. W. Baier. *Council*: Dr. J. E. Garside, Ph.D., M.Sc.Tech.; Mr. R. A. F. Hammond, B.Sc., A.R.C.S.; Mr. H. Silman, B.Sc., F.R.I.C., A.M.I.Chem.E.; Mr. A. Smart, B.Sc.; Mr. A. W. Wallbank, B.Sc. *Faraday Society Representative*, Dr. A. Hickling. *Ex-officio Members*: Mr. N. A. Tope (chairman, Midlands Centre), Mr. R. C. Davies (hon. secretary, Midlands Centre), Mr. E. A. Ollard, A.R.C.S., F.R.I.C. (hon. secretary, Standards Committee).

B.A.C. CHANGES

As a result of recent annual general meetings, both at headquarters and in the local sections, a number of changes among the hard-working officials of the B.A.C. fall to be recorded. At headquarters, MR. NORMAN SHELDON, hitherto hon. sec. of the London section, becomes vice-chairman in place of Mr. J. W. Fisher, and MR. H. L. HOWARD succeeds Dr. F. W. Stoyle as hon. registrar. MR. D. JACKSON is the new chairman of the London section, in place of Mr. E. Leighton Holmes, while MR. W. T. HERBERT takes over from Mr. Sheldon as hon. secretary.

At Liverpool, MR. E. MYER replaces Mr. E. Finklestone as hon. sec. and similar changes have occurred in the secretaryship of three other sections. At Derby, MR. J. A. HAWKES succeeds Mr. G. Bingham; in the North-East, MR. G. GARBUTT replaces Mr. S. A. Polaine; and in Yorkshire MR. G. H. GOSSOP follows Mr. R. Marsh.

In the new Slough section, which held its first annual meeting in May, MR. L. L. PEARSON was re-elected chairman, and MR. R. F. BIRD became hon. secretary.

In the ruins of a store shed in the Krupp works at Essen, ¾ ton of uranium ore has been discovered by British authorities after some considerable search. It was known that Krupps had been using uranium oxide in experimental work on hard steel manufacture. The ore, confiscated under the relevant clause of the Potsdam agreement, has now been shipped to Britain.

Parliamentary Topics

Government-Owned Steelworks

IN the House of Commons last week, Mr. Langford-Holt asked the Minister of Supply what was the total amount of capital moneys invested by the Government in the Government-owned steelworks at Monkbridge, Leeds, and Barrow-in-Furness; and whether he would publish the trading results of those two works up to March 31 last.

Mr. Wilmot replied that the total capital expenditure was £724,000 at the Barrow works, and £522,000 at the Monkbridge works. The operation of the Barrow works resulted in a net loss of £779,000 from November 1, 1942, to March 31 last; and of the Monkbridge works in a net loss of £180,000 from August 10, 1942, to March 31 last. Production from the two works was needed for national requirements, but they were uneconomic producers and would not normally have been kept in operation. The Government acquired ownership to maintain production and since that time output had been satisfactory. The trading losses were less than would have been the cost of importing an equivalent quantity of steel.

Penicillin

Mr. Wilmot, in reply to questions by Sir John Mellor, said penicillin supplies were steadily increasing, but it would not be possible for some time to estimate the demand accurately. He would consider the desirability of discontinuing control immediately it was apparent that supplies were sufficient to meet an uncontrolled demand.

Atomic Energy

Mr. Blackburn asked the Minister of Supply whether he would make a statement as to the progress made either in Britain or Canada with the production of radium and of radio-active isotopes as by-products of atomic energy.

Mr. Wilmot pointed out that radium was not produced as a by-product of atomic energy, but stated that an atomic energy "pile," capable of producing radio-active isotopes, was nearing completion in Canada, and some of its products would be distributed to recognised institutions in the U.K. Production of radio-active isotopes would begin in this country on completion of the "piles" now under construction. In reply to a further question, Mr. Wilmot repeated "quite categorically" that the danger to surrounding areas from the Atomic Energy Research Establishment was negligible.

Use of Magnesium Factories

Answering questions by Mr. Awbery, Mr. Wilmot stated: "Three factories, erected at Government expense during the war, have ceased the production of magnesium as, with the end of the war, the demand has fallen very steeply. The first, erected at a cost of £990,000, is surplus to requirements and has been transferred to the Ministry of Works for temporary house production, pending a decision as to its final use. The second, erected at a cost of £4,350,000, has been placed on a care and maintenance basis as standby capacity, and is being used for storage. The third was only partly employed on magnesium production, expenditure on magnesium capacity being £760,000. The entire factory has been notified as surplus, to the Board of Trade." In reply to a further question, Mr. Wilmot said the demand for magnesium during the war was 100,000 tons a year, but it was now less than 2500 tons, most of which could be obtained from scrap. It was impossible to destroy the capacity to produce magnesium.

Ground-nuts

The Minister of Food, replying to a question by Mr. Driberg, stated that the quantity of ground-nuts shipped from the Port of Madras and the other usual Coromandel coast ports to the U.K. so far this year was 40,865 tons. Further supplies could not be expected as long as the present prohibition continued on the export of ground-nuts from India. The tonnage originally expected for the whole of 1946 was 250,000 tons.

Oil Seeds

In answer to questions by Sir R. Glyn, the Minister of Food said he did not feel it would be in the public interest to publish figures giving the present stock position of oil seeds in the U.K. Supplies were based on the recommendations of the International Emergency Food Council, on which the U.K. was represented. All possible measures were being taken to ensure the largest possible supplies for this country.

Palm Oil

The Minister of Food, replying to a question by Sir D. Thomson, stated that the Ministry had purchased for some time ahead the entire production of palm oil from the principal estates in Malaya, and he was hoping to obtain a substantial part of the production of the few estates which were outside the main group.

Phenolic Moulding Powders

Mr. Belcher, in reply to a question by Sir I. Fraser, said the supply of phenolic moulding powders was now considerably greater than it was before or during the war, but no further substantial increase could be expected until additional manufacturing capacity came into operation towards the end of the year.

General News——From Week to Week

The National Coal Board assumed office as from July 15, but it does not take over the industry until "the vesting date," to be fixed by the Minister of Fuel later.

"The Operation of Gas Producers" is the title of the latest Fuel Efficiency Bulletin—No. 44—free copies of which are obtainable from the Ministry of Fuel.

The Widnes copper refining firm of Thomas Bolton & Sons, Ltd., has acquired Hales Hall, near Froghall Works, Widnes, as a hostel for technical trainees and junior technicians.

The Council of the Society of Chemical Industry has approved the publication of a monthly journal, *The Journal of the Science of Food and Agriculture*, as soon as paper supplies permit.

From Dublin comes news that a bill has been introduced into the Dail creating a new Institute for Industrial Research and Standards. It will replace the existing Industrial Research Council.

Now is suggested as a suitable time for a thorough overhaul of all fuel-using plant. The Ministry of Fuel free Bulletin No. 38, "Maintenance of Industrial Plant," will help in planning the work.

A conference on exports is to be held under the auspices of the F.B.I. at the Central Hall, Westminster, London, on November 27-28, when practical problems that face industry in the export drive will be defined and discussed.

A marked increase in the use of lime by Scottish farmers is shown in returns for the latter half of 1945 and the first quarter of 1946. Scottish producers of the higher grades of lime, although working to full capacity, have had difficulty in meeting the demand.

New D.T.D. Specifications, obtainable from H.M. Stationery Office at the prices stated, have been issued by the Ministry of Supply as follows: 495, "Calcium Chromate (for Corrosion Inhibitor Cartridges)," 6d.; 911a, "Protection of Magnesium-Rich Alloys against Corrosion" (superseding D.T.D. 911), 1s.

After nearly 57 years in their previous premises at Landore, Swansea, T. Dryden, chemical laboratory furnishers, have now removed into new and more commodious premises, at one time occupied by the Landore Cinema, 201 Neath Road, Landore. The former operating and film rooms now serve conveniently as offices, while the large hall is fitted out with modern shelving and racking. The acid department has been kept entirely separate.

I.C. (Pharmaceuticals), Ltd., have moved their offices from 89 Oxford Street, Manchester, 1, to "The Ridge," Beechfield Road, Alderley Edge, Manchester. The new telephone number is Alderley Edge 2231, but that of the distribution department is still Central 0387.

A large factory, which was erected by the Ministry of Supply at Barcaldine (between Oban and Baliachulish) during the war, and has been closed for about two years, has been re-opened by the Scottish Seaweed Research Association for the manufacture of chemicals and other products from seaweed.

Wholesale prices in June, measured by the Board of Trade index number, rose by 0.3 per cent. compared with May, due mainly to the increase in the price of raw cotton and cotton goods. In the chemicals and oils group the increase was 0.1 per cent. compared with May, and 54.2 per cent. compared with 1938.

The Ruabon works of Monsanto Chemicals, Ltd., are to be closed completely from August 3-13 inclusive so that major maintenance work can be carried out after seven years of continuous production, most of it 24 hours a day, seven days a week. A skeleton despatch service will deal with urgent requirements.

The Chemical Society will hold an extraordinary general meeting in the Society's Rooms, Burlington House, W.1, on July 25, at 3 p.m., to confirm the following proposal of the Council: "That as from January 1, 1947, the amount of the annual subscription be increased from £3 to £3 10s., and that a corresponding increase be made in the amount of the life composition fee."

A further cut in the volume of linseed oil available to the Scottish linoleum industry is foreshadowed in reports from Kirkcaldy, chief centre of this industry. Hopes that the industry might obtain sardine oil, which has been proved a satisfactory substitute for linseed oil in linoleum manufacture, have been discouraged by failure to obtain import licences.

More than 100 industrial chemists, mostly members of the Liverpool and North-Western Section of the Royal Institute of Chemistry, were entertained to a dinner and social evening at Liverpool to mark the opening of a refresher course which the section has organised in conjunction with Liverpool University. The course is divided into two parts: one for oils and fats, in charge of Professor Hilditch (Professor of Industrial Chemistry at the University), and the other for spectroscopy, in charge of Professor Morton (Professor of Biochemistry).

The foundation stone of the new office building of Tate & Lyle, Ltd., at their Plaistow Wharf sugar refinery, was laid on July 12, by Lord Lyle of Westbourne, who used the same silver trowel as his grandfather used at the foundation of the original buildings at Victoria Docks. The new office building is to replace the miscellaneous premises in which the offices were housed until destroyed by enemy action in 1940.

Foreign News

The Hermann Göring works in Linz—now called the United Iron & Steel Works—were handed over to the Austrian Government on Tuesday by the Americans.

Eight chemists are included among 30 technicians for whom arrangements have been made, at the request of the Government of India, to join British and American experts who are to investigate German technical and industrial processes likely to be advantageous to Allied industrial production.

The National Research Council of Canada earned $4,360,997 during the six years ended April 1 as payment for its services to private industry and other enterprises, according to a statement made by the Hon. C. D. Howe, Minister of Reconstruction, in the Canadian House of Commons.

The sale of the British-owned Indian firm of Govan Brothers, Ltd., to a Marhwari industrialist, Mr. S. R. Dalmia, announced last week by the Delhi correspondent of *The Times*, involves also the chemical manufacturing works of Dharangadhra Chemicals, which is to retain its identity.

China's tung oil production, which before the war occupied an unrivalled position in world markets, and reached an average annual output of 9000 tons, has, as a result of eight years of warfare, dwindled to about one-quarter of this figure. Owing to the soaring price of foodstuffs, farmers have in recent years planted cereals instead of tung seeds.

A leave scheme, whereby industrial scientists in its employ will be enabled to return to universities of their choice for an academic year of study at full salary, has been inaugurated by the Monsanto Chemical Co., of America. Leave will be granted on the basis of especially meritorious service and outstanding performance in scientific work.

U.S. output of metal powder has kept up its war-time peak of about 200 million lb. annually; heavy demand is expected from chemical and electrical companies. Great progress has been made in the production of iron powder, which was formerly bought from Sweden but is now made in America, and will probably be considerably lower in price than the present figure of $250 a ton.

The American Standards Association has announced publication of its 1945-46 Year Book, the first issue since 1938, and therefore containing much new material. Copies of the Year Book may be obtained free of charge on writing to the American Standards Association, 70 East 45th Street, New York 17, N.Y.

Among the Indian industries for which nationalisation is considered desirable, according to an official article in the current issue of the *Board of Trade Journal*, are: heavy and fine chemicals, chemical dyes, fertilisers and pharmaceutical drugs; chemical machinery; electro-chemical industry; sugar; non-ferrous metals; iron and steel; rubber manufacture.

A patent recently granted to Du Ponts in the U.S. names ammonium nitrate in liquid anhydrous ammonia as a fuel for internal combustion engines, and, since ammonium nitrate contains oxygen which can be easily liberated and then immediately combined with the other elements, an engine using such fuel would need no outside source of oxygen; and it would be "non-fouling," since carbon would not be deposited from the fuel.

A message from Montreal states that the National Drug & Chemical Co., has called a special meeting of shareholders for August 7 to consider arrangements to reorganise the share capital. According to a statement by the president, Mr. C. H. Lander, the control of the company was held for many years by preference shareholders residing in England, from whom recently over 90 per cent. of the preference shares has been acquired by Canadian interests, with a result that voting control now rests in Canada.

A World Conference on Mineral Resources will be held in the United States in connection with official observance of the 75th Anniversary of the American Institute of Mining and Metallurgical Engineers on September 16-18. Every phase of the world's situation with respect to ferrous and non-ferrous metals, coal, petroleum, and other important industrial minerals will be covered, and Mr. Herbert Hoover, a past-president of the Institute, will be hon. chairman.

What is considered to be one of the world's richest molybdenum mines is situated in Yangchiahangtzu, 25 miles north of Hulutao in Liaotung Bay. Lead and zinc ores found in the deposit have been exploited since 1935 by the Japanese-controlled Manchurian Heavy Industries Company. Molybdenum was not discovered until 1939, when the Japanese estimated the ore reserves at about 8,000,000 tons, with a metal content of 40 per cent. However, the mines cannot at present be exploited because most of the equipment has been removed by Russia.

Company News

Yorkshire Copper Works, Ltd., are again paying an ordinary dividend of 10 per cent., plus bonus of 5 per cent. Profit for 1945 amounted to £78,768, against £71,155 for 1944.

The report of **Lovering China Clays, Ltd.,** for the year ended March 31 shows net profit of £6101, as compared with £2546. This reduces the debit balance to £16,914, which is carried forward.

Net profit of £24,356 for 1945 is shown by the **Permutit Co., Ltd.,** this comparing with the previous year's figure of £20,662. The ordinary dividend of 10 per cent. and bonus of 2½ per cent. are the same as before.

British Timken, Ltd., have now published accounts for 1945, showing net profit of £70,360. This includes £10,000 dividend from subsidiary and compares with £52,624 for the previous year. The dividend of 15 per cent. is the same as previously.

An increase in ordinary dividend from 10 per cent. to 15 per cent. is announced by **British Glues & Chemicals, Ltd.** Profit for the year to April 30 last amounted to £109,384, as compared with £101,725 the previous year.

The Distillers Co., Ltd., report that the group's manufacturing and trading profits to May 15 last totalled £6,914,290, after E.P.T. and overseas taxation, this figure comparing with £6,581,330 for the previous year. The total ordinary distribution is up by 2½ per cent. to 22½ per cent.

Chloride Electrical Storage Co., Ltd., is paying bonus of 10 per cent. (including 5 per cent. victory bonus) in addition to the final ordinary dividend of 5 per cent., making 20 per cent. for the year ended March 31 last, as against 15 per cent. for the previous year. Profit amounted to £486,928 (£426,033).

British Drug Houses, Ltd., has been granted permission to deal in 175,000 5 per cent. cumulative preference shares of £1 each and 200,000 ordinary shares of £1 each. Preference shares are offered to holders at 24s. in the proportion of one new for every two held, while the ordinary shares are offered to existing holders at 50s. in the same proportion.

An issue to shareholders will shortly be made by **British Industrial Plastics, Ltd.** It is proposed to issue new 2s. ordinary shares to existing holders in the proportion of two new for every seven ordinary held. The issue has been guaranteed by British Shareholders Trust. The present issued capital of the company consists of £14,820 in 10 per cent. free of tax cumulative preference shares of 2s. and £429,891 10s. in 2s. ordinary shares.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

INTERNATIONAL CORRODELESS, LTD., Enfield, proprietors of patent for treating metals for their preservation from corrosion. (M., 20/7/46.) June 11, debenture to Lloyds Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *Nil. February 28, 1946.

SURREY COPPER CO., LTD., Surbiton. (M., 20/7/46.) June 12, £2300 (not ex.) and £800 (not ex.) mortgages to Lloyds Bank, Ltd.; respectively charged on 70, 72, 74 and 76 King Charles Road, and on land at rear of 24, 25, 26, 27, 27a, 28 and 29 Alpha Road, Surbiton. *Nil. December 14, 1945.

Satisfaction

UNION GLUE & GELATINE CO., LTD., (formerly British American Glue & Gelatine Co., Ltd.), London, E.C. (M.S., 20/7/46.) Satisfaction June 24, of charge registered August 25, 1945.

Companies Winding-Up Voluntarily

MARVOS CHEMICAL MANUFACTURING CO. (LUTON), LTD. (C.W.U.V., 20/7/46.) By special resolution, July 2. N. G. Randall, of A. A. Henley & Co., 19-20 Grosvenor Place, London, S.W.1, appointed liquidator.

Chemical and Allied Stocks and Shares

HELPED by the U.S. loan and the strength of British Funds, stock markets were firm, small gains ruling in most sections, although generally there was only a moderate increase in the volume of business. Argentine rails remained prominently active, but home rails lost part of earlier rise.

Shares of chemical and kindred companies have been firm in accordance with the general tendency, attention being centred mainly on shares of concerns with important connections both in home and export trade. Imperial Chemical strengthened to 43s. 6d., Turner & Newall rose to 93s., Lever & Unilever to 57s., and United Molasses to 57s. 3d.

Borax Consolidated showed firmness at 48s. 9d., B. Laporte were maintained at 100s., while on satisfaction with the new issue terms, British Drug Houses were 61s. 3d. ex rights to the new shares, with the latter at 10s. 6d. premium. Reflecting further consideration of the results, British Glues 4s. ordinary held their rise to 15s. 7½d. xd, while Imperial Smelting were better at 19s. 6d., and a rise to 22s. 3d. in Amalgamated Metal shares was attributed to hopes that the London Metal Exchange may be re-opened this year. General Refractories were 23s. 1½d., but Dunlop Rubber at 74s. 9d. lost part of an earlier rise. British Match 50s., British Oxygen 102s. 6d., British Aluminium 43s., and British Plaster Board 36s. 3d. have been firm, the last-named on the full results. Cement shares were strong on the belief that the industry can expect increasing demand for a long time to come; Associated Cement rose to 72s. 6d., Tunnel Cement to 50s. 6d., and Rugby Cement 5s. shares to 15s. 3d.

Iron, coal and steels continued to show a better tendency, on the view that current prices may prove under-valuations, despite nationalisation uncertainties. Stewarts & Lloyds moved up to 50s. 3d., while United Steel hardened to 22s. 10½d., and Guest Keen to 40s. 9d. Powell Duffryn improved to 22s. 4½d. on the full report, and a further sharp rise to 36s. 6d. was shown in Shipley. Staveley were also higher at 46s. 6d., and T. W. Ward were 44s. 6d.

Courtaulds have been active around 57s. 6d., with British Celanese 38s., and textiles generally firm. Bleachers further improving to 14s. 9d. in anticipation of the forthcoming capital scheme. De La Rue were £12¾, British Xylonite changed hands up to £7 15/16, Erinoid were 16s., and the recently introduced 2s. shares of O. & M. Kleemann advanced further to 41s. British Industrial Plastics 2s. shares eased slightly to 8s. 7½d., awaiting terms of the company's new share issue. In other directions, British Tar Products rose further to 14s. 3d., British Lead Mills were 12s. 9d., Lawes Chemical 13s. 3d., and Monsanto Chemicals 5½ per cent. preference marked 24s. 6d. Greeff-Chemicals Holdings 5s. ordinary changed hands around 13s. 3d., Burt Boulton were 27s. 6d., Fisons 62s. 6d., Goodlass Wall 32s., and United Glass Bottle 91s. 6d., Triplex Glass fell back to 40s. at one time, but later rallied to 42s. 6d.

Boots Drug at 63s. remained under the influence of the full results. Timothy Whites rose to 46s. 9d. Sangers were 34s., Griffiths Hughes 60s., and Beechams deferred have been active around 27s. 3d. Ruston & Hornsby were 60s. 9d. "ex rights," the new shares being 5s. premium. Swedish shares were marked higher on the revaluation of the krona, Swedish Match being 41s. 3d., a rise of 4s. 9d. Oil shares were unresponsive to the forthcoming increase in the petrol "ration," although most of the leaders were higher on balance, Shell being 95s. 7½d., but, reflecting the latest news from Persia, Anglo-Iranian declined to 99s. 4½d.

British Chemical Prices

Market Reports

STEADY trading conditions have again been reported on the London chemical market, more especially with regard to contract specifications. New business has been in evidence and the export demand has been unabated, though in nearly all directions prompt deliveries are difficult to secure. Permanganate of potash is in good call and a ready market awaits offers of bichromate of potash. In the soda products section chlorate of soda, yellow prussiate of soda, and the sulphides are firm on a strong request, while a steady movement is reported for both the photographic and technical grades of hyposulphite of soda. The coal-tar products market continues firm, with the demand generally in excess of available supplies. Pitch has again been active, and the export inquiry for cresylic acid has been maintained.

MANCHESTER.—Marked firmness continues to characterise most sections of the Manchester market for heavy chemicals, and the recent sharp rises in the non-ferrous metal compounds appear to have had little restrictive effect on the volume of business. The movement of textile bleaching, dyeing, and finishing chemicals against contracts has been affected to a slight extent by industrial holidays in cotton towns, but, on the whole, consumption has been on steady lines, and a fair flow of new inquiries from home users has been in the market. Export buyers have also been fairly prominent. In the leading tar products fairly active trading conditions have been reported and some new shipping business has been arranged.

GLASGOW.—With the approach of the Glasgow Fair holidays, the demand for general chemicals for the home trade had a tendency to ease off towards the end of last week. Prices remained firm all round, with increase in value of oxalic acid and acetates. The export market is still occupied with arrears of orders, and more inquiries have been coming in.

Price Changes

Copper Carbonate.—MANCHESTER: £8 15s. per cent.

Lead Nitrate.—MANCHESTER: £55.

Sodium Sulphide. — Broken, 60/62%, £20 2s. 6d. per ton; flake, 60/62%, £21 17s. 6d. per ton; crystals, 30/32%, £13 7s. 6d. per ton. Carriage paid U.K. stations, in 1-ton lots.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each. Numbers given under "Applications for Patents" are for reference in all correspondence up to acceptance of the complete specification.

Applications for Patents

Rolling of metals.—M. Fairest, Ltd., M. Fairest, and H. Akers. 17348.

Rotary kilns.—J. S. Fasting. 17979.

Silica hydrosol.—J. G. Fife. (Davison Chemical Corporation.) 17478.

Die-casting machines.—C. G. Garrard. 18164.

Liquid dispensing.—Gaskell & Chambers, Ltd., and J. S. Weightman. 17882.

Water softening.—Gas Light & Coke Co., R. P Donnelly, F. E. Mills, and W. R. Dudden. 17748.

Fibre dyeing.—J. R. Geigy A.G. 17383.

Insecticides.—J. R. Geigy A.G. 18075.

Reclaiming plastic scrap.—Gem Participations, Inc. 17584.

Silver halide emulsions.—N.V. Gevaert Photo-Producten. 17596.

Methine dyestuffs.—N.V. Gevaert Photo-Producten, and J. Beersmans. 18126.

Chemical percentage indicators.—T. W. Gilmour. 17368.

Liquid atomisers.—S. Gimelli. 17762.

Zinc-containing materials.—Glacier Metal Co., Ltd., and W. H. Tait. 17959.

Emulsifying plants.—R. C. Glaze. 17947.

Stroboscopic tachometers.—J. Gudgeon. 17551.

Liquid-dispensing apparatus.—G. Morgan-Harris. 17505.

Ferrous alloys.—Haynes Stellite Co. 17841-50.

Electrotherapeutic baths.—J. Heller. 18100-1.

Detergents.—F. W. Kay. 17343.

Fluoro-chloro compounds. — Kinetic Chemicals, Inc. 17707-8.

Liquid dispensing.—W. van Leer. 17665.

Tin-plating solutions.—London Chemical Products, H. Stern, and B. Gluck. 18081.

Alloys. — Mathieson Alkali Works. 17805-6-7.

Chemical compounds.—Merck & Co., Inc. 17671-2-3.

Electrode holders.—A. Middleton. 17930.

Liquid dispensing.—F. W. Milwain, and W. Evans. 17880-1.

Dispensing devices.—T. A. Mulhearn. 18025.

Liquid-dispensing devices.—W. V. Myers Co., Ltd., and W. V. Myers. 17822.

Liquid measuring apparatus.—N.V. Philips Gloeilampenfabrieken. 18035.

Starches.—N.V. W. A. Scholten's Chemische Fabrieken. 17604.

Plastic material.—C. Nicolle. 17718.

Azo compounds.—Norsk Hydro-Elektrisk Kvaelstof A/S. 17816.

Waxed polish.—G. R. Palmer. 17821.

Aerial spraying.—Pest Control, Ltd., and P. W. Tudor. 17812.

Aerial spraying.—Pest Control, Ltd., W. E. Ripper, A. K. Dorman, E. J. Marshall, and P. W. Tudor. 17813.

Olefines.—Phillips Petroleum Co. 17405

Testing of colour extracts.—A. Pilny. 18191-2.

Treatment of glyceride oils.—Pittsburgh Plate Glass Co. 17904.

Connecting devices.—Plastic Housing (Patents), Ltd., and I. Shamah. 17818-9.

Fluid flow control apparatus.—R. Poole. 17492.

Fluid flow meters.—R. Poole. 17929.

Fluid compressors.—C. A. Pugh, L. A. Darby, and Plessey Co., Ltd. 17709.

Metal coatings.—Pyrene Co., Ltd. (Parker Rust-Proof Co.) 17792.

Pyridine.—Pyridium Corporation. 17482-3, 17486.

Pyridium compounds.—Roche Products, Ltd. 17814.

Fluid-separating means.—Shell Development Co. 17476.

Fertilisers.—R. E. Slade. 18092.

Benzene hexachloride.—Solvay & Cie. 18016.

Aluminium-silicon alloys.—Spolik pro Chemickou a Hutni Vyrobu. 17582.

Styrene compositions.—Standard Telephones & Cables, Ltd. 18007.

Complete Specifications Open to Public Inspection

Continuous electrodes for electric furnaces.—Norsk A/S for Elektrokemisk Industri. July 13, 1939. 13098/46.

Hydrolysis of acetone auto-condensation products.—Shell Development Co. Dec. 5, 1944. 28783/45.

Treatment of materials with gases.—A/S F. L. Smidth & Co. Dec. 8, 1944. 6478/46.

Bleaching of fibres.—Solvay & Cie. Dec. 15, 1944. 32483/45.

Catalytic isomerisation processes and reformed catalysts therefor.—Standard Oil Development Co. Sept. 13, 1941. 9409/42.

Synthesis of hydrocarbons.—Standard Oil Development Co. Dec. 14, 1944. 15489/45.

Lubricants.—Standard Oil Development Co. April 17, 1941. 19711-2/45.

Synthesis of hydrocarbons.—Standard Oil Development Co. Dec. 16, 1944. 22298/45.

Treatment of vinyl chloride-vinylidene chloride copolymers.—Wingfoot Corporation. June 11, 1943. 20641/43.

Bactericides.—A/S Niro Atomiser. Dec. 18, 1944. 11634/46.

Recovery of metallic magnesium from its ores.—Aluminium Co. of America. June 29, 1944. 13780/46.

Cellulose derivative compositions.—British Celanese, Ltd. Dec. 21, 1944. (Cognate application 34768/45.) 34767/45.

Cellulose ether compositions.—British Celanese, Ltd. Dec. 21, 1944. 34770/45.

Dimethyl silicon compositions.—British Thomson-Houston Co., Ltd. Dec. 23, 1944. 34220/45.

Stable supersaturated solutions of saccharide derivatives of compounds of the suprarenal cortex hormone series.—Ciba, Ltd. Dec. 22, 1944. (Cognate application 33487/45.) 33486/45.

Azo-dyestuffs.—Ciba, Ltd. Dec. 19, 1944. (Cognate applications 34269-70/45.) 34268/45.

Utilising liquefied fuel gases.—Cie. Française de Raffinage. May 18, 1942. 14083/46.

Alkylation processes.—Cie. Française de Raffinage. Nov. 17, 1942. 14206/46.

Continuous catalysis.—Cie. Française de Raffinage. May 8, 1943. 14208/46.

Hydrocarbon storage tank with strengthened roof.—C. Couvy (née Piron). Dec. 19, 1944. (Cognate application 9837/46.) 9836/46.

Rendering liquids nebulous.—A. Denier. Dec. 19, 1944. 34183/45.

Low carbon metal alloys and the like.—Det Norske A/S for Elektrokemisk Industri. Aug. 18, 1943. 13930/46.

Polymers and interpolymers of ethylene.—E. I. Du Pont de Nemours & Co. April 9, 1940. 4729/41.

Polymerisation of olefinic compounds.—E. I. Du Pont de Nemours & Co. March 15, 1941. 12118/41.

Ethylene polymerisation processes.—E. I. Du Pont de Nemours & Co. July 30, 1942. 12402/43.

Solid and semi-solid polymers from aliphatic mono-olefines.—E. I. Du Pont de Nemours & Co. Dec. 3, 1942. 20214/43.

Polymerisation of olefines.—E. I. Du Pont de Nemours & Co. Dec. 9, 1942. 20501/43.

Polymers and interpolymers of ethylene.—E. I. Du Pont de Nemours & Co. March 4, 1943. 3986/44.

Organic nitro compounds.—E. I. Du Pont de Nemours & Co. Dec. 22, 1944. 34721/45.

Azo-dyestuffs capable of being chromed.—J. R. Geigy A.G. Dec. 21, 1944. 33488/45.

Condensation products.—J. R. Geigy A.G. Dec. 19, 1944. 34223/45.

Complete Specifications Accepted

Electrode arrangement infusion electrolytic cells.—S. Kloumann. April 18, 1944. 578,026.

Drawing dies.—S. Kryszek, Hard Alloys, Ltd., and Caledonian Metal Co., Ltd. June 20, 1944. 578,066.

Purification of calcium sulphate.—P. Kubelka. Dec. 29, 1938. (Convention date not granted.) 577,970.

Catalytic treatment with hydrogen of glyceride oils or fats.—Lever Bros. & Unilever, Ltd. Feb. 19, 1943. 578,102.

Fibres, films and the like.—D. McCreath, and I.C.I., Ltd. March 5, 1943. 578,016.

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Water-proofing of casein formaldehyde plastics.—J. B. Speakman, J. L. Stoves, and Erinoid, Ltd. Nov. 10, 1943. 578,148.

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Polymerisation of trifluorochloroethylene.—American Viscose Corporation. July 14, 1943. 578,168.

Production of hydrogen-containing gases.—M. H. M. Arnold, and I.C.I., Ltd. April 7, 1944. 578,323.

Process of manufacture of polymers from acrylonitrile.—R. G. R. Bacon, L. B. Morgan, and I.C.I., Ltd. May 17, 1944. 578,209.

Adhesive bonding of surfaces or adhesive compositions (or processes of preparing the same) suitable for use therein.—B.B. Chemical Co., Ltd., L. E. Puddefoot, and K. J. George. Aug. 21, 1942. 578,304.

Aluminium copper alloy.—T. F. Bradbury, and T. J. Peake. Nov. 17, 1941. 578,222.

Method of producing cellular resin materials.—N. A. De Bruyne. Dec. 10, 1941. 578,264.

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